installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP GAS HEATING/ELECTRIC COOLING UNITS

580D
Sizes 090-150
$7^1/_2$ to $12^1/_2$ Tons

Cancels: II 580D-90-4

II 580D-90-5
7/15/00

IMPORTANT — READ BEFORE INSTALLING

1. Read and become familiar with these installation instructions before installing this unit (Fig. 1).
2. Be sure the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

CONTENTS

SAFETY CONSIDERATIONS

⚠ **WARNING:** Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, explosion, fire, electric shock, or other occurrences which may cause injury or property damage. Consult a qualified installer, service agency, or the gas supplier for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

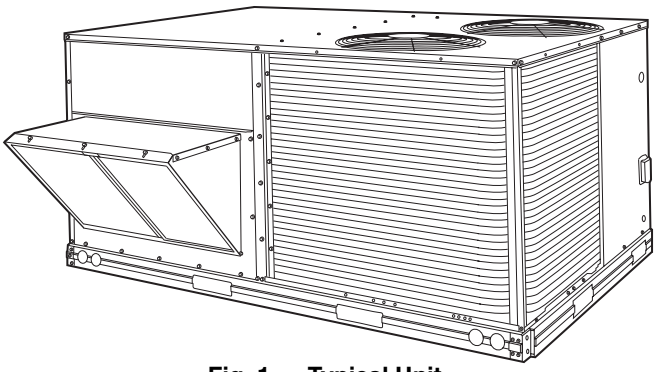


Fig. 1 — Typical Unit

Recognize safety information. This is the safety-alert symbol (⚠). When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words — DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. Danger identifies the most serious hazards which will result in severe personal injury or death. Warning indicates a condition that could result in personal injury. Caution is used to identify unsafe practices which would result in minor personal injury or product and property damage.

⚠ **WARNING:** Disconnect gas piping from unit when leak testing at pressure greater than $^1/_2$ psig. Pressures greater than $^1/_2$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is ever subjected to pressure greater than $^1/_2$ psig, it must be replaced before use. When pressure testing field-supplied gas piping at pressures of $^1/_2$ psig or less, a unit connected to such piping *must* be isolated by manually closing the gas valve.

⚠ **WARNING:** Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag. Electrical shock could cause personal injury.

1. The power supply (volts, hertz, and phase) must correspond to that specified on unit rating plate.
2. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.
3. Locate connections for gas inlet, electrical inlets, condensate drain, duct connections, and required clearances before setting unit in place. Refer to Locate the Unit section on page 2 and Fig. 2-4 for locations.

4. Locate the unit where the vent hood will be a minimum of 4 ft from openable windows or doors.
5. This installation must conform with local building codes and with NFGC (National Fuel Gas Code); ANSI (American National Standards Institute) Z223.1-1988 (Canada, CAN/CGA [Canadian Gas Association] B149.1, [2]-M86); or NFPA (National Fire Protection Association) 54-1988 TIA-54-84-1. Refer to Provincial and local plumbing or wastewater codes and other applicable local codes.
6. Approved for outdoor installation only on wood flooring or on class A, B, or C roof covering materials.

INSTALLATION

Unit is shipped in the vertical airflow configuration (see Fig. 1). To convert to horizontal discharge, remove horizontal duct opening covers. Using the same screws, install covers with insulation-side down (facing outside) on the unit on vertical duct openings. Seals around duct openings must be tight.

These units are equipped with an energy-saving, automatic, electric direct-spark ignition system that does not have a continuously burning pilot. All units are manufactured with natural gas controls.

These units are designed for a minimum continuous return-air temperature of 50 F (dry bulb) or an intermittent operation down to 45 F (dry bulb), such as when used with a night setback thermostat.

All units can be connected into existing duct systems *that are properly sized and designed to handle an airflow of 300 to 500 cfm per each 12,000 Btuh of rated cooling capacity.*

NOTE: When installing any accessory item, see the manufacturer's installation instructions packaged with the accessory. A qualified agency must use factory-authorized kits or accessories when modifying this unit.

I. LOCATE THE UNIT

A. Clearance

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access (see Fig. 2 and 3).

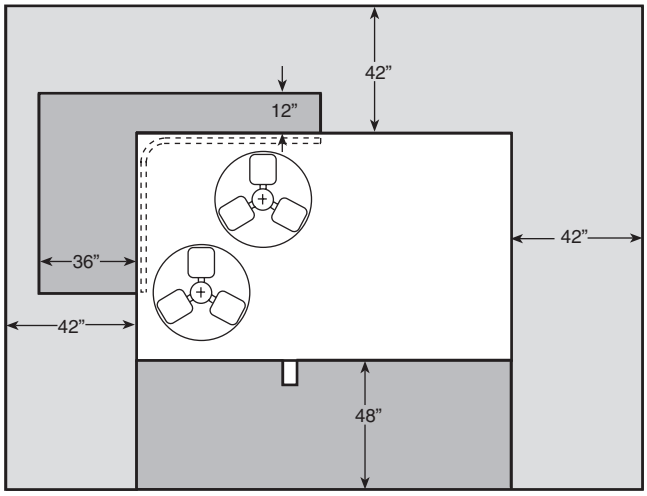


Fig. 2 — Service and Operational Clearances

Minimum clearance to combustibles is 48 in. on flue side (18 in. with accessory flue discharge deflector), 0 in. on all other sides.

Minimum clearance on all sides to block walls or any other grounded surface is 42 inches.

Minimum clearance of 36 in. should be provided on side with outdoor-air intake, if unit is so equipped.

Minimum distance between unit and other electrically live parts is 48 inches.

Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air.

Be sure that unit is installed so that snow will not block the combustion intake or flue outlet.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Slab-mounted units should be at least 4 in. above the highest expected water, flood, and runoff levels. Do not use the unit if it has been under water.

Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, and at least 24 in. from an adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

Flue gas can deteriorate building materials. Orient unit so that flue gas will not affect building materials.

Adequate combustion-air space must be provided for proper operation of this equipment. Be sure that installation complies with all local codes.

Flue vent discharge must have a minimum horizontal clearance of 4 ft from electric and gas meters, gas regulators, and gas relief equipment.

B. Roof Curb Mount

Assemble and install accessory roof curb in accordance with instructions shipped with curb (see Fig. 4). Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb.* If gas, electric power, or control power is to be routed through the curb, attach the utility connection plates to the roof curb in accordance with the accessory installation instructions. Accessory electric and gas utility connection plates must be installed before unit is in place on roof curb.

NOTE: If thru-the-bottom power and gas connections are used, refer to the accessory installation instructions for information on installation. Refer to Fig. 3 for drilling holes in basepan.

IMPORTANT: The gasketing of the unit to the roof curb is critical for watertightness. Install gasket with the roof curb as shown in Fig. 4. Improperly applied gasket can also result in air or water leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 5.

C. Slab Mount (Horizontal Units Only)

Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a 6 in. gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE: Horizontal units may be installed on a roof curb if required.

UNIT 580D	STANDARD UNIT WEIGHT		DURABLADE ECON. WEIGHT		ECONOMI$ER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
090	870	395	44	20	62	28	189	86	161	73	239	109	280	127	1-2 7/8	378	3-5 5/16	1050	2-9 11/16	856	2- 2 7/16	672
102	880	399					191	87	163	74	242	110	284	129	3-3 7/8	1013	3-5 5/16	1050	2-9 11/16	856	2- 2 7/16	672
120	1035	469					225	102	192	87	285	129	333	151	2-5 7/8	759	4-1 5/16	1253	3-0 3/8	924	2-10 7/16	875
150	1050	476					228	103	195	88	289	131	338	153	1-2 7/8	378	4-1 5/16	1253	3-0 3/8	924	2-10 7/16	875

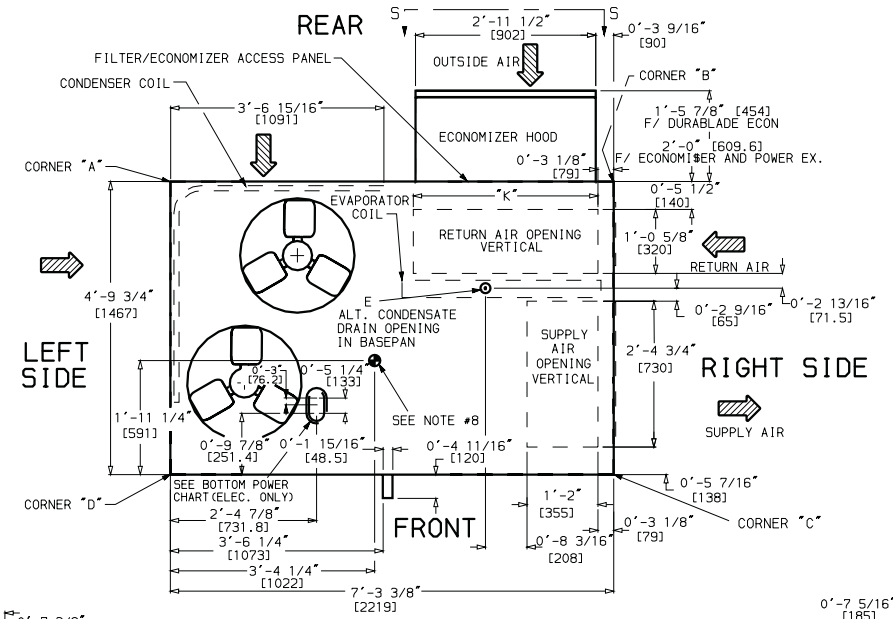
	CONNECTION SIZES
A	1 3/8″ Dia [35] Field Power Supply Hole
B	2 1/2″ Dia [64] Power Supply Knockout
C	1 3/4″ Dia [44] Charging Port Hole
D	7/8″ Dia [22] Field Control Wiring Hole
E	3/4″ — 14 NPT Condensate Drain
F	1/2″ — 14 NPT Gas Connection 580D090-102, low heat units. 3/4″ — 14 NPT Gas Connection All other units.
G	2″ Dia [51] Power Supply Knockout

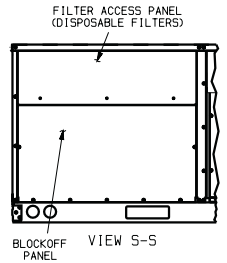
NOTES:
1. Dimensions in [ ] are in millimeters.
2. Center of gravity.
3. Direction of airflow.
4. On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units field-supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges.
5. Minimum clearance (local codes or jurisdiction may prevail):
   a. Between unit (flue side) and combustible surfaces, 48 in. (18 in. with accessory flue discharge deflector).
   b. Bottom of unit to combustible surfaces (when not using curb) 1 inch. Bottom of base rail to combustible surfaces (when not using curb) 0 inches.
   c. Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.
   d. Overhead, 60 in. to assure proper condenser fan operation.
   e. Between units, control box side, 42 in. per NEC (National Electrical Code).
   f. Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
   g. Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.
   h. Horizontal supply and return end, 0 inches.
6. With the exception of the clearance for the condenser coil and combustion side as stated in Notes 5a, b, and c, a removable fence or barricade requires no clearance.
7. Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail.
8. The vertical center of gravity is 1′-7″ [483] for 090 and 102, 1′-11″ [584] for 120 and 150 up from the bottom of the base rail.

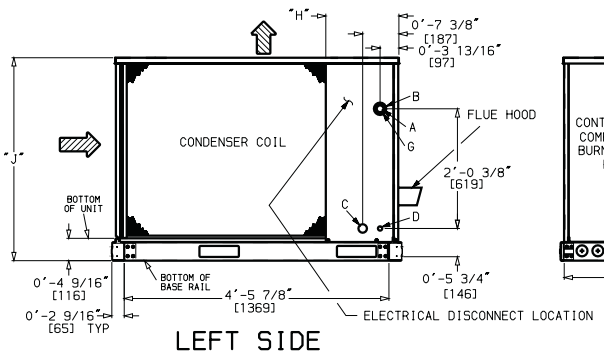
BOTTOM POWER CHART, THESE HOLES REQUIRED FOR USE WITH ACCESSORY PACKAGES CRBTMPWR001A00, 3A00 (1/2″, 3/4″) OR CRBTMPWR002A00, 4A00 (1/2″, 1 1/4″)

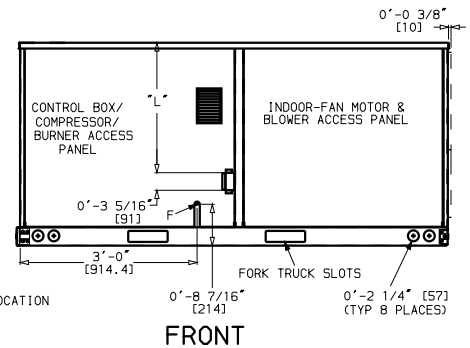
THREADED CONDUIT SIZE	WIRE USE	REQUIRED HOLE SIZES (MAX.)
1/2″	24 V	7/8″ [22.2]
3/4″	Power*	1 1/8″ [28.4]
1 1/4″	Power*	1 3/4″ [44.4]
(003) 1/2″ FPT	Gas	1 1/4″ [31.8]
(004) 3/4″ FPT	Gas	1 5/8″ [41.3]

*Select either 3/4″or 1 1/4″ for power, depending on wire size.









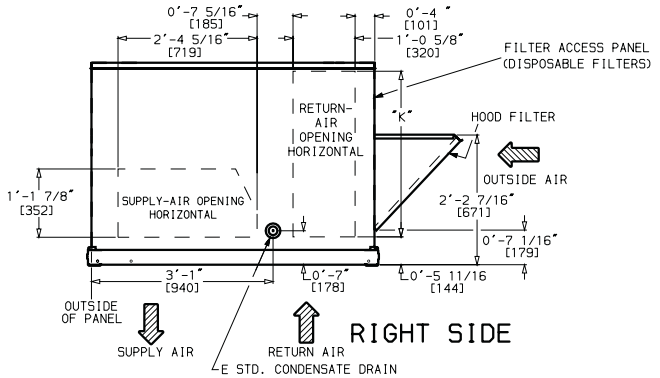


Fig. 3 — Base Unit Dimensions

"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PACKAGE ACCESSORY
2′-8 7/16″ [827]	1′-10 15/16″ [583]	1 3/4″ [44.5]	3/4″ [19] NPT	3/4″ [19] NPT	1/2″ [12.7]	CRBTMPWR001A00
				1 1/4″ [31.7]		CRBTMPWR002A00
			1/2″ [12.7] NPT	3/4″ [19] NPT	1/2″ [12.7]	CRBTMPWR003A00
			3/4″ [19] NPT	1 1/4″ [31.7]		CRBTMPWR004A00

ROOF CURB ACCESSORY	"A"	UNIT SIZE 580D
CRRFCURB003A00	1′-2″ [356]	090-150
CRRFCURB004A00	2′-0″ [610]	

NOTES:
1. Roof curb accessory is shipped unassembled.
2. Insulated panels.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A00 and 002A00 are for thru-the-curb connections. Packages CRBTMPWR003A00 and 004A00 are for thru-the-bottom connections.

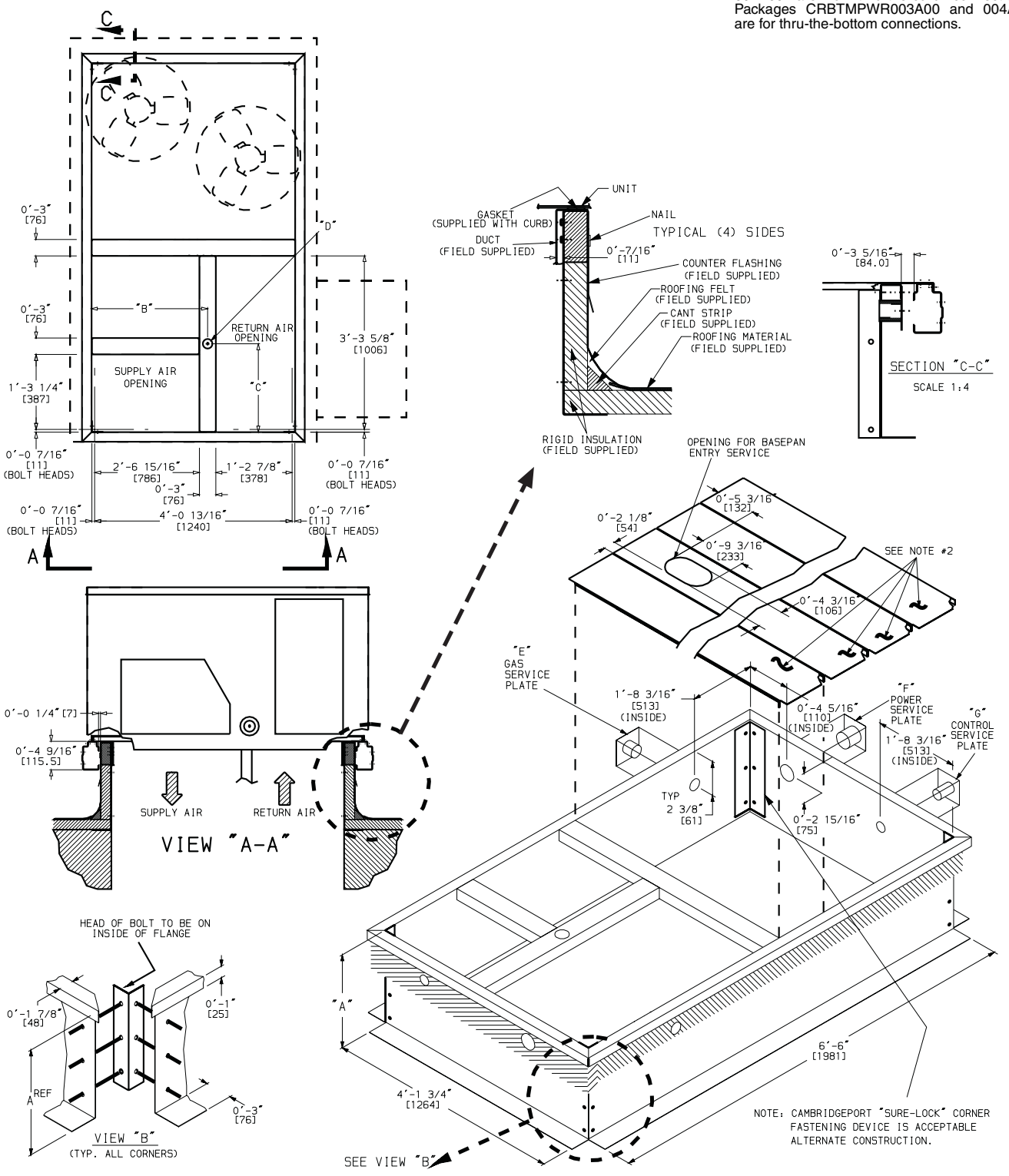
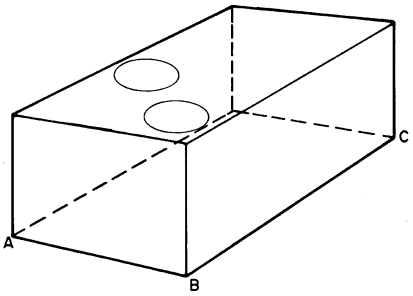


Fig. 4 — Roof Curb Dimensions



MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B	B-C	A-C
0.5	1.0	1.0

Fig. 5 — Unit Leveling Tolerances

II. UNIT DUCT CONNECTIONS

On vertical units, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* On horizontal units, duct flanges should be attached to horizontal openings and all ductwork should be secured to flanges.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork. Cabinet return-air static shall not exceed –0.35 in. wg with Durablade and EconoMi$er economizer or –0.45 in. wg without economizer.

NOTE: Connection must be made to roof curb before unit is set in place.

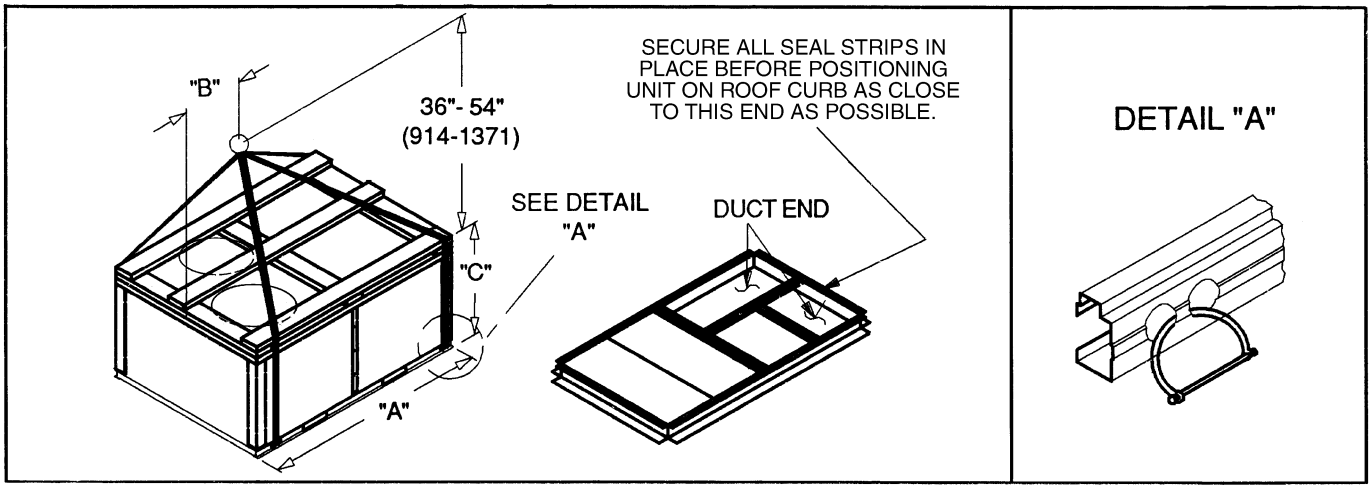
III. RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 6 for additional information. Operating weight is shown in Fig. 6.

Lifting holes are provided in base rails as shown in Fig. 6. Refer to rigging instructions on unit.

IMPORTANT: Unit has forklift protection skids (wood runners located behind forklift slots), be sure to remove forklift protection skids from under unit before setting unit in place.

A properly positioned unit will have the following clearances between unit and roof curb: $^1/_4$-in. clearance between roof curb and base rails on each side, $3^5/_{16}$-in. at duct end of unit; $^1/_4$-in. clearance between roof curb and condenser section end. See Fig. 4, Views A-A and C-C.



UNIT 580D	OPERATING WEIGHT		"A"		"B"		"C"	
	Lb	Kg	in.	mm	in.	mm	in.	mm
090	870	395	87.38	2219	40.25	1022	41.31	1050
102	880	399					41.31	1050
120	1035	469					49.31	1253
150	1050	476					49.31	1253

NOTES:
1. Dimension in ( ) is in millimeters.
2. Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.
3. Weights do not include economizer. See Table 1 for economizer weights.

⚠ **CAUTION:** All panels must be in place when rigging.

Fig. 6 — Rigging Details

Table 1 — Physical Data

UNIT 580D		090			102			120			150	
NOMINAL CAPACITY (tons)		7 1/2			8 1/2			10			12	
OPERATING WEIGHT (lb)												
Unit		870			880			1035			1050	
Durablade Economizer		44			44			44			44	
EconoMi$er Economizer		62			62			62			62	
Roof Curb*		143			143			143			143	
COMPRESSOR		Reciprocating			Reciprocating			Reciprocating			Scroll	
Quantity		2			2			2			2	
Oil (oz)		50 ea			50 ea			54 ea			54 ea	
REFRIGERANT TYPE		R-22										
Operating Charge (lb-oz)												
Circuit 1		4-13			6-2			7-3			8-10	
Circuit 2		4-14			9-8			7-13			8-6	
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins										
Rows...Fins/in.		1...17			2...17			2...17			2...17	
Total Face Area (sq ft)		20.50			18.00			20.47			25.00	
CONDENSER FAN		Propeller Type										
Nominal Cfm		6500			6500			7000			7000	
Quantity...Diameter (in.)		2...22			2...22			2...22			2...22	
Motor Hp...Rpm		1/4...1100			1/4...1100			1/4...1100			1/4...1100	
Watts Input (Total)		600			600			600			600	
EVAPORATOR COIL		Enchanced Copper Tubes, Aluminum Double-Wavy Fins										
Rows...Fins/in.		3...15			3...15			3...15			4...15	
Total Face Area (sq ft)		8.0			8.0			10.0			11.1	
EVAPORATOR FAN		Centrifugal Type										
Quantity...Size (in.)	Std	1...15 x 15			1...15 x 15			1...15 x 15			1...15 x 15	
	Alt	1...15 x 15			—			1...15 x 15			1...15 x 15	
Type Drive	Std	Belt			Belt			Belt			Belt	
	Alt	—			—			Belt			Belt	
Nominal	Std	3000			3400			4000			5000	
	Alt	3000			—			4000			5000	
Maximum Continuous Bhp	Std	2.40			2.40			2.40			3.70	
	Alt	—			—			2.90			5.25	
Motor Frame Size	Std	56			56			56			56	
	Alt	—			—			56			56	
Fan Rpm Range	Std	590-840			685-935			685-935			860-1080	
	Alt	685-935			—			835-1085			900-1260	
Motor Bearing Type		Ball			Ball			Ball			Ball	
Maximum Allowable Rpm		2100			2100			2100			2100	
Motor Pulley Pitch Diameter	Std	2.4/3.4			2.8/3.8			2.8/3.8			4.0/5.0	
Min/Max (in.)	Alt	2.8/3.8			—			3.4/4.4			3.1/4.1	
Nominal Motor Shaft Diameter (in.)	Std	5/8			5/8			5/8			7/8	
	Alt	—			—			7/8			7/8	
Fan Pulley Pitch Diameter (in.)	Std	7.0			7.0			7.0			8.0	
	Alt	7.0			—			7.0			5.9	
Belt, Quantity...Type...Length (in.)	Std	1...A...48			1...A...51			1...A...51			1...A...51	
	Alt	1...A...51			—			1...A...57			1...BX...46	
Pulley Center Line Distance (in.)	Std	16.75-19.25			16.75-19.25			15.85-17.50			15.85-17.50	
	Alt	16.75-19.25			—			15.85-17.50			15.85-17.50	
Speed Change per Full Turn of	Std	50			50			50			44	
Movable Pulley Flange (rpm)	Alt	50			—			50			60	
Movable Pulley Maximum Full Turns	Std	5			5			5			5	
From Closed Position	Alt	5			—			5			6	
Factory Setting	Std	5			5			5			5	
	Alt	5			—			5			6	
Factory Speed Setting (rpm)	Std	590			685			685			860	
	Alt	685			—			835			900	
Fan Shaft Diameter at Pulley (in.)		1			1			1			1	
FURNACE SECTION		Low Heat	Medium Heat	High Heat	Low Heat	Medium Heat	High Heat	Low Heat	Medium Heat	High Heat	Low Heat	Medium Heat
Rollout Switch Cutout Temp (F)†		195	195	195	195	195	195	195	195	195	195	195
Burner Orifice Diameter (in. ...drill size)												
Natural Gas		.120...31	.120...31	.120...31	.120...31	.120...31	.120...31	.120...31	.120...31	.129...30	.120...31	.120...30
Liquid Propane**		.096...41	.096...41	.096...41	.096...41	.096...41	.096...41	.096...41	.096...41	.102...38	.096...41	.102...38
Thermostat Heat Anticipator Setting (amps)												
208/230 v Stage 1		.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14
Stage 2		.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20
460 v Stage 1		.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14
Stage 2		.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20
Gas Input (Btuh) Stage 1		125,000	120,000	180,000	125,000	120,000	180,000	120,000	180,000	2000,000	180,000	200,000
Stage 2		—	180,000	220,000	—	180,000	220,000	180,000	220,000	250,000	220,000	250,000
Efficiency (Steady Stage) (%)		80	80	80	80	80	80	80	80	80	80	80
Temperature Rise Range		20-50	35-65	45-75	20-50	35-65	45-75	35-65	35-65	40-70	35-65	40-70
Manifold Pressure (in. wg)												
Natural Gas		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Liquid Propane**		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Gas Valve Quantity		1	1	1	1	1	1	1	1	1	1	1
Field Gas Connection Size (in.)		1/2	3/4	3/4	1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4
HIGH-PRESSURE SWITCH (psig)††												
Standard Compressor Internal Relief (Differential)						450 ± 50					500 ± 50	
Cutout						428					428	
Reset (Auto.)						320					320	
LOW-PRESSURE/LOSS-OF-CHARGE SWITCH (psig)††												
Cutout						7 ± 3						
Reset (Auto.)						22 ± 7						
FREEZE-PROTECTION THERMOSTAT (F)††												
Opens						30 ± 5						
Closes						45 ± 5						
OUTDOOR-AIR INLET SCREENS						Cleanable						
Quantity...Size (in.)						1...20 x 25 x 1 1...16 x 25 x 1						
RETURN-AIR FILTERS						Throwaway						
Quantity...Size (in.)		4...16 x 20 x 2			4...16 x 20 x 2			4...20 x 20 x 2			4...20 x 20 x 2	

LEGEND

Bhp — Brake Horsepower

*Weight of 14-in. roof curb.
†Rollout switch is manual reset.
**Indicates a FIOP (Factory-Installed Option).
††Requires an optional or accessory controls upgrade kit.

IV. FIELD CONNECTIONS

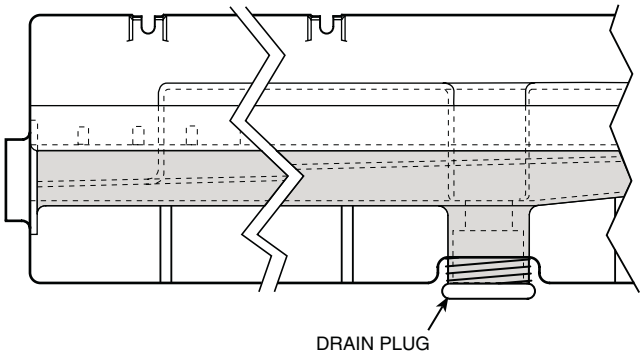
A. External Trap Condensate Drain

The unit's $^3/_4$-in. condensate drain connections are located on the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, make sure the plug in the alternate bottom connection is tight before installing the unit.

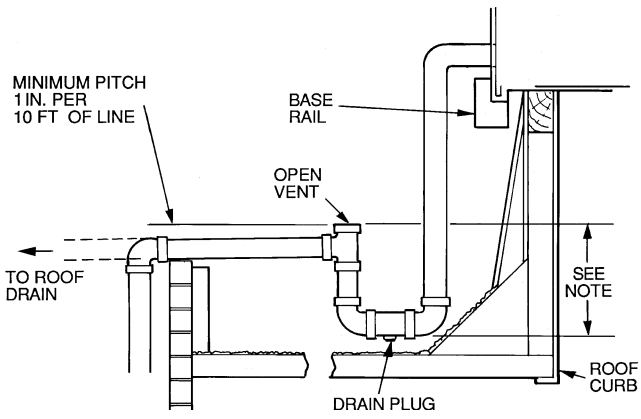
To use the bottom drain connection for a roof curb installation, relocate the factory-installed plug from the bottom connection to the side connection. See Fig. 7. The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap at least 4-in. deep and protect against freeze-up. See Fig. 8. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection ($^3/_4$-in.).



NOTE: Drain plug is shown in factory-installed position.

Fig. 7 — Condensate Drain Pan



NOTE: Trap should be deep enough to offset maximum unit static difference. A 4-in. trap is recommended.

Fig. 8 — External Trap Condensate Drain

B. Install Flue Hood

Flue hood is shipped screwed to the burner compartment access panel. Remove from shipping location and, using screws provided, install flue hood and screen in location shown in Fig. 3 and 9.

C. Gas Piping (Fig. 10)

The gas supply pipe enters the unit through the access hole provided. The gas connection to the unit is made to the $^1/_2$- or $^3/_4$-in. FPT gas inlet on the manual shutoff or gas valve.

Install a separate gas supply line that runs directly from the meter to the heating section. Refer to NFGC for gas pipe sizing. *Do not use cast iron pipe.* Check the local utility for recommendations concerning existing lines. Choose a supply pipe that is large enough to keep the pressure loss as low as practical. *Never use pipe smaller than the $^1/_2$-in. FPT gas inlet on the unit gas valve.* See Table 1 for specific unit pipe size.

For natural gas applications, the gas pressure at unit gas connection must not be less than 4 in. wg or greater than 13 in. wg while the unit is operating. For liquid propane applications, the gas pressure must not be less than 5 in. wg or greater than 13 in. wg at the unit connection.

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to NFGC ANSI Z223.1-1988 (in Canada, CAN/CGA B149.1, [2]-M86) or NFPA 54-1988 in the absence of local building codes. Adhere to the following pertinent recommendations:

NOTE: When installing gas piping to gas valve inlet, use properly sized back-up wrench on gas valve inlet flange flats.

1. Avoid low spots in long runs of pipe. Grade all pipe $^1/_4$ inch in every 15 ft to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft. For pipe sizes larger than $^1/_2$-in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. *Never use Teflon coated tape.*
4. Install sediment trap in riser leading to heating section. This drip leg functions as a trap for dirt and condensate. Install trap where condensate cannot freeze. Install this sediment trap by connecting a piping tee to riser leading to heating section, so that straight-through section of tee is vertical (see Fig. 11). Then, connect capped nipple into lower end of tee. Extend capped nipple below level of gas controls.

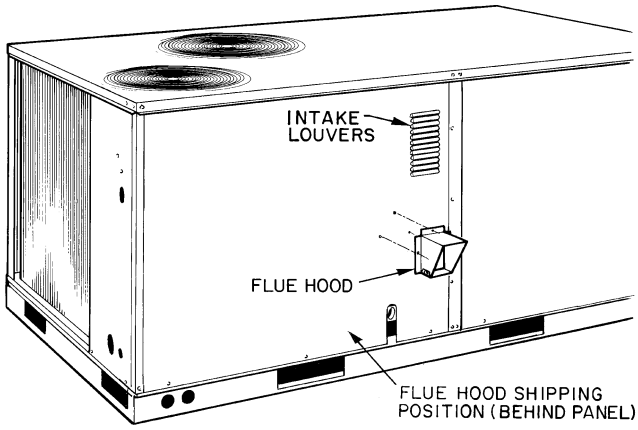


Fig. 9 — Flue Hood Details

5. Install an accessible, external, manual main shutoff valve in gas supply pipe within 6 ft of heating section.
6. Install ground-joint union close to heating section between unit manual shutoff and external manual main shutoff valve.
7. Pressure-test all gas piping in accordance with local and national plumbing and gas codes before connecting piping to unit.
8. If thru-the-bottom power connections are used refer to the accessory installation instructions for information on power wiring. Refer to Fig. 3 for drilling holes in basepan.

NOTE: When pressure testing the gas supply system *after* the gas supply piping has been connected to the unit gas valve, the supply piping must be disconnected from the gas valve during any pressure testing of the piping systems at test pressure in excess of 0.5 psig. When pressure testing the gas supply piping system at test pressures equal to or less than 0.5 psig, the unit heating section must be isolated from the gas piping system by closing the external main manual shutoff valve and slightly opening the ground-joint union.

⚠ **CAUTION:** Unstable operation may occur when the gas valve and manifold assembly are forced out of position while connecting improperly routed rigid gas piping to the gas valve. Use a backup wrench when making connection to avoid strain on, or distortion of, the gas control piping.

⚠ **CAUTION:** If a flexible conductor is required or allowed by the authority having jurisdiction, black iron pipe shall be installed at the gas valve and extend a minimum of 9 in. outside the unit casing.

⚠ **DANGER:** never use a match or other open flame when checking for gas leaks. Never purge gas line into combustion chamber. Failure to adhere to this warning could result in an explosion causing personal injury or death.

9. Check for gas leaks at all field- and factory-installed gas lines after all piping connections have been completed. Use soap-and-water solution (or method specified by local codes and/or regulations).

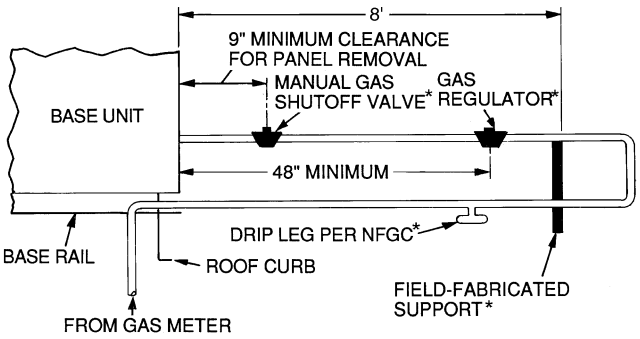
Liquid Propane (LP)

Units are shipped for use with natural gas, but may be field-converted for use with liquid propane with accessory LP Kit.

All LP gas equipment must conform to NFPA safety standards.

The LP gas pressure at the unit must be between 5.0 in. wg and 13.0 in. wg under full load. Maintaining proper gas pressure depends on:

1. Vaporization rate. (Vaporization rate is determined by the temperature of the LP and the level of LP in the tank.)
2. Proper pressure regulation. (Two-stage regulation is more cost effective and more efficient than single-stage regulation.)
3. Pressure drop in lines between regulators and between the second-stage regulator and the appliance. Pipe size is determined by the length of the pipe run and the total load of all appliances.



LEGEND
NFGC — National Fuel Gas Code
*Field supplied.

NOTE: Follow all local codes.

STEEL PIPE NOMINAL DIAMETER (in.)	SPACING OF SUPPORTS X DIMENSIONS (ft)
1/2	6
3/4 or 1	8
1 1/4 or Larger	10

Fig. 10 — Gas Piping Guide (With Accessory Utility Connection Package)

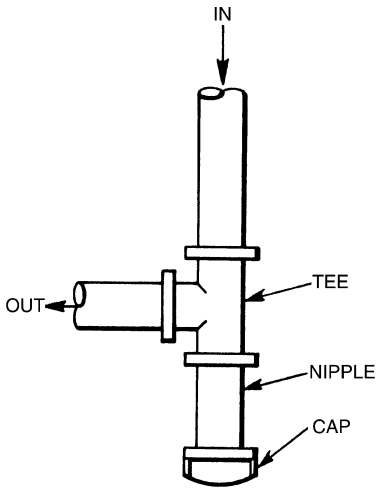


Fig. 11 — Sediment Trap

Contact your LP gas supplier or regulator manufacturer for further details regarding tank sizing, recommended regulator settings, and pipe sizing.

Special pipe compound must be used when assembling piping for LP gas, as white lead or commercial compounds will be dissolved easily. Use a shellac-based compound suitable for use with LP.

D. Field Duct Connections

NOTE: The design and installation of the duct system must be in accordance with the standards of the NFPA for the installation of nonresidence-type air conditioning and ventilating systems, NFPA No. 90A or residence-type, NFPA No. 90B; and/or local codes and ordinances.

Adhere to the following criteria when selecting, sizing, and installing the duct system:

1. Remove appropriate panels from unit to obtain either horizontal or vertical discharge. If units are installed in horizontal discharge applications, remove vertical discharge duct covers, save screws, and install covers on vertical duct openings.
2. Select and size ductwork, supply-air registers, and return-air grilles according to ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) recommendations.

⚠ **CAUTION:** When drilling the duct system fastening holes into the side of the unit for duct flanges, use extreme care not to puncture the coil or coil tubes. See Fig. 12.

3. Use flexible transition between rigid ductwork and unit to prevent transmission of vibration. The transition may be screwed or bolted to duct flanges. Use suitable gaskets to ensure weather- and airtight seal.
4. When horizontal return is used, install external, field-supplied air filters in return-air ductwork where they are easily accessible for service. Recommended filter sizes are shown in Table 1.
5. Size all ductwork for maximum required airflow (either heating or cooling) for unit being installed. Avoid abrupt duct size increases or decreases.
6. Adequately insulate and weatherproof all ductwork located outdoors. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with latest issue of SMACNA (Sheet Metal and Air Conditioning Contractors National Association) and ACCA (Air Conditioning Contractors of America) minimum installation standards for heating and air-conditioning systems. Secure all ducts to building structure.
7. Flash, weatherproof, and vibration isolate all openings in building structure in accordance with local codes and good building practices.

NOTE: If accessory thru-the-bottom connections are used, refer to the accessory installation instructions for installation.

E. Electrical Connections

⚠ **WARNING:** The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to the unit ground lug in the control compartment, or conduit approved for electrical ground when installed in accordance with the NEC (National Electrical Code) ANSI/NFPA, latest edition, (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1) and local electrical codes. *Do not use gas piping as an electrical ground.* Failure to adhere to this warning could result in personal injury.

⚠ **CAUTION:** Failure to adhere to the following electrical connection procedures could result in damage to the unit being installed:

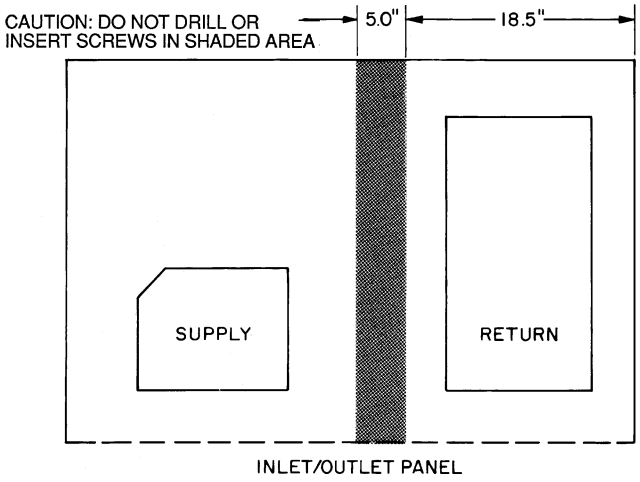


Fig. 12 — Location of Coil Area Not to be Drilled

Field Power Supply (Fig. 13 and 14)

1. Make all electrical connections in accordance with NEC ANSI/NFPA, latest edition, and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA Standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only *copper* conductor for connections between field-supplied electrical disconnect switch and unit. Maximum wire size is no. 2 AWG (American Wire Gage).
3. Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 2). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 2 to determine the percent voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable warranty.
4. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are run in same conduit as high-voltage wires.
5. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

NOTE: If accessory thru-the-bottom connections are used, refer to the accessory installation instructions for installation.

High-Voltage Connections (Fig. 13)

The unit must have a separate electrical service with a field-supplied, waterproof, fused disconnect switch mounted at, or within sight from, the unit. Refer to the unit rating plate for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing. Table 2 shows recommended wire sizes based on rating plate data.

The field-supplied disconnect switchbox may be mounted on the unit over the high-voltage inlet hole in the control corner panel. Be sure that disconnect box and horizontal ducts do not cover the unit rating plate.

Proceed as follows to complete the high-voltage connections to the unit:

1. Connect ground lead to chassis ground connection when using separate ground wire.
2. Pigtails are provided for field power connection. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper connector. Install conduit connectors in side panel power supply knockout openings indicated in Fig. 3. Route power lines through connector to unit control box.

Table 2 — Electrical Data

UNIT 580D	NOMINAL VOLTAGE	IFM TYPE	VOLTAGE RANGE		COMPR (ea)		OFM (ea)		IFM	COMBUSTION FAN MOTOR FLA	POWER SUPPLY		DISCONNECT SIZE*	
			Min	Max	RLA	LRA	Hp	FLA	FLA		MCA	MOCP†	FLA	LRA
090 (7 1/2 Tons)	208/230-3-60	Std	187	254	14.0	91.0	1/4	1.4	5.8	.6	40.1/40.1	45/45	42/42	229/229
		Alt							5.8		40.1/40.1	45/45	42/42	229/229
	460-3-60	Std	414	508	6.4	42.0	1/4	0.7	2.6	.3	18.4	20	19	108
		Alt							2.6		18.4	20	19	108
	575-3-60	Std	518	632	5.2	39.0	1/4	0.7	2.6	.3	14.9	20	16	97
		Alt							2.6		14.9	20	16	97
102 (8 1/2 Tons)	208/230-3-60	Std	187	254	16.0	137.0	1/4	1.4	5.8	.6	44.6/44.6	50/50	41/41	321/321
	460-3-60	Std	414	508	8.3	69.0	1/4	0.7	2.6	.3	22.7	25	24	162
	575-3-60	Std	518	632	6.4	58.0	1/4	0.7	2.6	.3	17.6	20	18	135
120 (10 Tons)	208/230-3-60	Std	187	254	15.8	130.0	1/4	1.4	5.8	.6	44.2/44.2	50/50	46/46	307/307
		Alt							7.5		45.9/45.9	50/50	48/48	326/326
	460-3-60	Std	414	508	7.9	64.0	1/4	0.7	2.6	.3	21.8	25	23	152
		Alt							3.4		22.6	25	24	191
	575-3-60	Std	518	632	6.6	52.0	1/4	0.7	2.6	.3	18.9	25	20	126
		Alt							3.4		19.7	25	21	166
150 (12 1/2 Tons)	208/230-3-60	Std	187	254	23.0	146.0	1/4	1.4	10.6	.6	65.2/65.2	80/80	68/68	383/383
		Alt							15.0		69.6/69.6	80/80	73/73	406/406
	460-3-60	Std	414	508	10.4	73.0	1/4	0.7	4.8	.3	29.6	35	31	192
		Alt							7.4		32.2	35	34	203
	575-3-60	Std	518	632	8.3	58.4	1/4	0.7	4.8	.3	23.6	30	25	154
		Alt							7.4		25.7	30	27	163

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

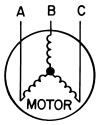
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

   $$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

NOTE: The 575-v 48TJ008-014 units are UL, Canada only.

Determine maximum deviation from average voltage.

(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

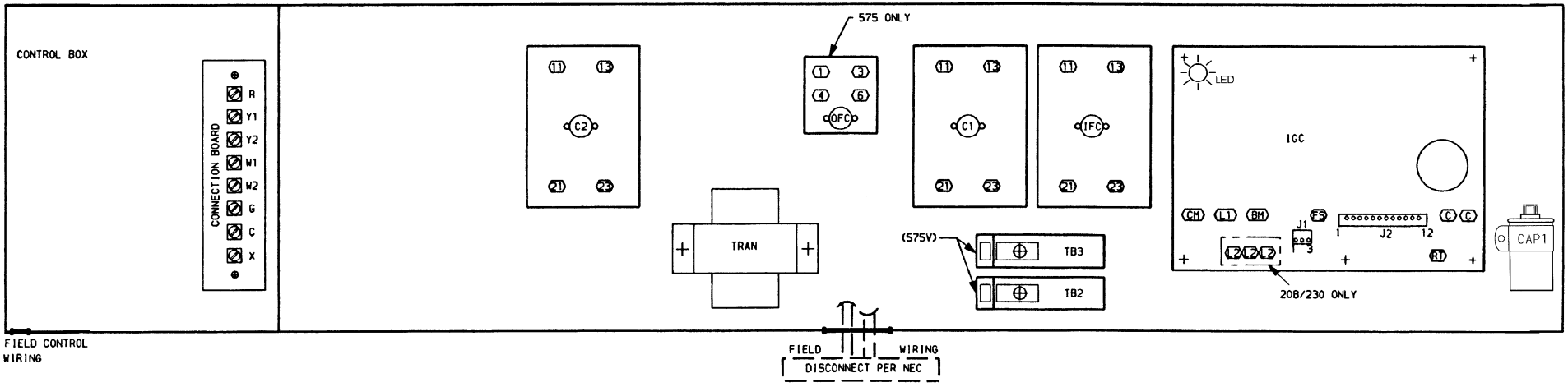
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%

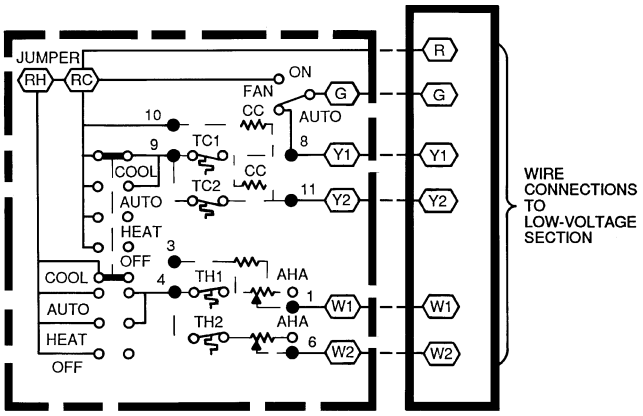
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.



LEGEND

BM	— Blower (Evaporator Fan) Motor	**LED**	— Light-Emitting Diode
C	— Contactor	**NEC**	— National Electrical Code
CAP	— Capacitor	**OFC**	— Outdoor (Condenser) Fan Contactor
CM	— Combustion Motor	**RT**	— 24 v Power to Integrated Gas Unit Controller
FS	— Flame Sense	**TB**	— Terminal Block
IFC	— Indoor (Evaporator) Fan Contactor	**TRAN**	— Transformer
IGC	— Integrated Gas Unit Controller		

Fig. 13 — Field Wiring Connections



LEGEND

AHA — Adjustable Heat Anticipator
CC — Cooling Compensator
TC — Thermostat-Cooling
TH — Thermostat-Heating
Field Wiring
Factory Wiring

Fig. 14 — Low-Voltage Connections

Special Procedures for 208-V Operation

⚠ **DANGER:** Make sure that the power supply to the unit is switched OFF and lockout tag is installed before making any wiring changes. Electrical shock can cause personal injury or death.

For operation on 208 v:

Remove black wire with $^1/_4$-in. female spade connector from the 230-volt male spade transformer and connect to 200 volt $^1/_4$-in. spade of transformer.

Control Voltage Connections

Install a factory-approved room thermostat. Locate the thermostat on an inside wall in the space to be conditioned where it will not be subjected to either a cooling or heating source or direct exposure to sunlight. Mount the thermostat 4 to 5 ft above the floor.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than 18 AWG cannot be connected directly to the thermostat and will require a junction box and splice at the thermostat.

Pass control wires through the hole provided in the corner post; then feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box (see Fig. 15). The raceway provides the UL required clearance between high- and low-voltage wiring.

Connect thermostat wires to pigtails of low-voltage circuit in low-voltage section on control box using terminal strip.

Heat Anticipator Setting

The room thermostat heat anticipator must be adjusted correctly to ensure proper heating performance. Set the heat anticipator, using an ammeter to determine the exact required setting.

NOTE: For thermostat selection purposes, use .14 amp for the approximate required setting. For units with two-stage gas valves, set heat anticipator stage 2 at .20 amp. See Table 1 for further clarification.

Failure to make a proper heat anticipator adjustment may result in improper operation, discomfort to the occupants of the conditioned space, and inefficient energy utilization; however, the required setting may be changed slightly to provide a greater degree of comfort for a particular installation.

F. Accessory Installation

Any required accessories should be installed on the unit at this time. Refer to Table 3 for available accessories. Control wiring information is provided in the unit wiring book.

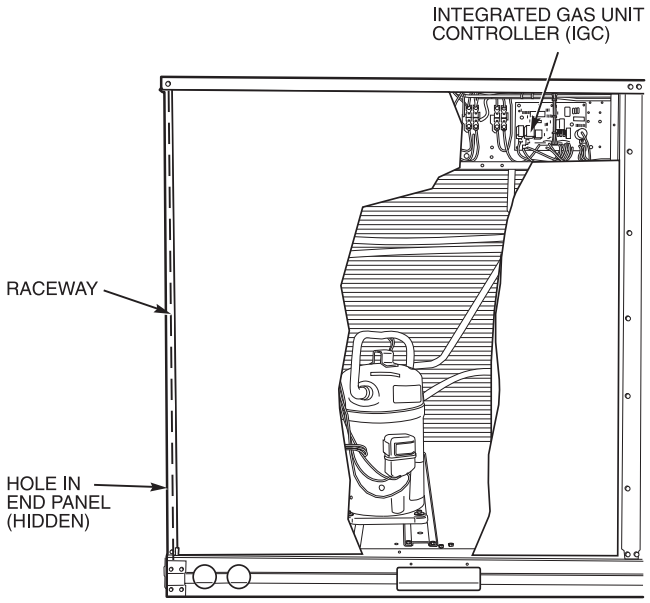


Fig. 15 — Field Control Wiring Raceway

Table 3 — Accessory List

ACCESSORY
Roof Curb (14 in.)
Roof Curb (24 in.)
Low Ambient Controls
Condenser Coil Hail Guard Assembly
LP (Liquid Propane) Kit
Manual Outdoor-Air Damper
Two-Position Damper
Durablade Economizer
EconoMi$er
Power Exhaust
Time Guard® II 5-Minute Recycle Timer*
Controls Upgrade Package
Solid-State Enthalpy Control
Differential Enthalpy Control
Flue Hood Protector Assembly
Flue Discharge Deflector
Low No_x Kit
Condenser Coil Grille

*See unit wiring book for proper installation instructions.

NOTE: Two Time Guard II timers are required.

G. Optional Outdoor-Air Damper Installation

The outdoor-air hood and screen are attached to the basepan at the bottom of the unit for shipping.

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove filter access panel. Remove and save outdoor-air opening panel and screws. See Fig. 16.
3. Separate hood and screen from basepan by removing the 6 screws and brackets securing them. Save all screws and discard brackets.
4. Replace outdoor-air opening panel and filter access panel.
5. Place hood on front of outdoor-air opening access panel. See Fig. 17 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 18.
6. Remove and save screws from sides of the manual outdoor-air damper assembly.
7. Align screw holes on hood with screw holes on side of manual outdoor-air damper assembly. See Fig. 17 and 18. Secure hood with screws from Step 6.
8. For proper quantity of ventilation air, adjust minimum position setting of the damper blade by adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 16. Slide blade vertically until it is in the appropriate position determined by Fig. 19. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screen. Secure screen to hood using the screws. See Fig. 18.

H. Optional Durablade Economizer Installation

The optional economizer hood assembly is packaged and shipped in the filter section. Damper blades and control boards are installed at the factory and the economizer is shipped in the vertical discharge position.

NOTE: Horizontal discharge block-off plate is shipped with the air hood package. If unit is to be used for vertical discharge application, discard this plate.

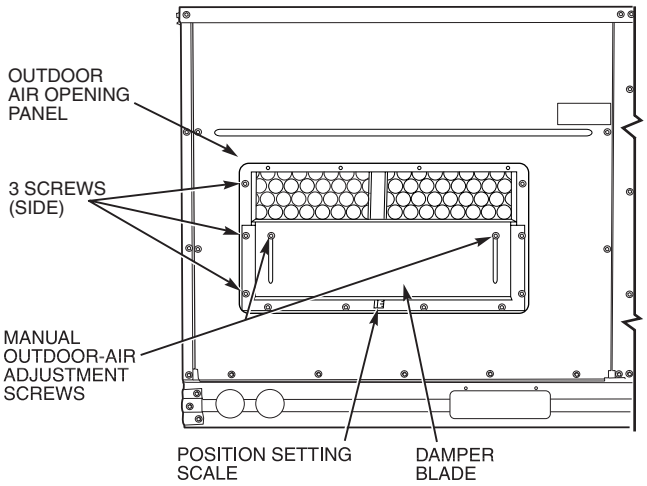


Fig. 16 — Damper Panel with Outdoor-Air Damper Installed

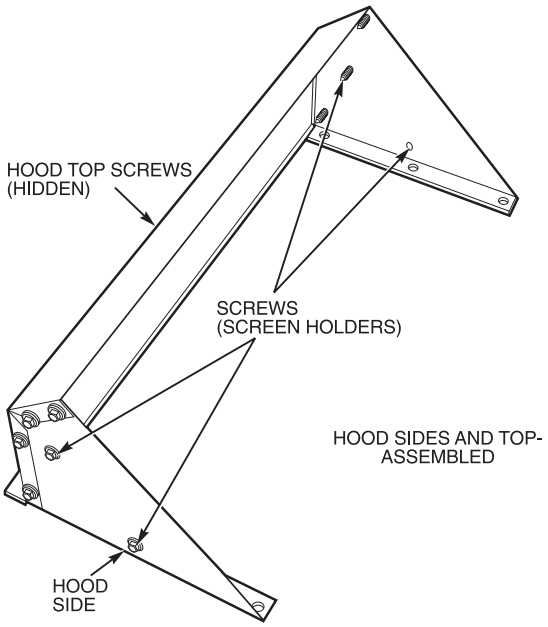


Fig. 17 — Outdoor-Air Hood Details

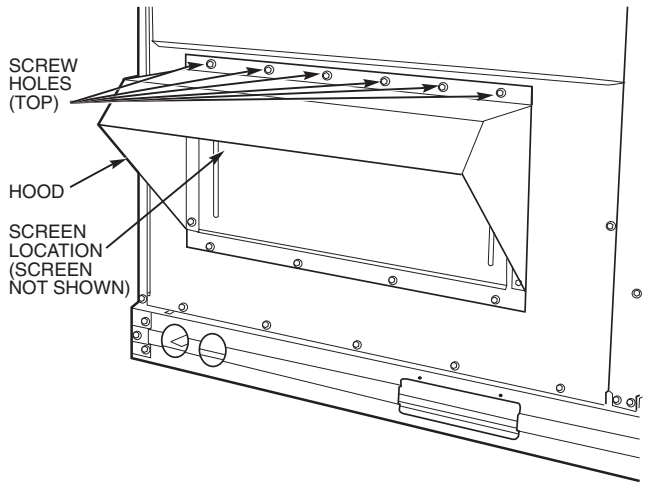


Fig. 18 — Outdoor-Air Hood

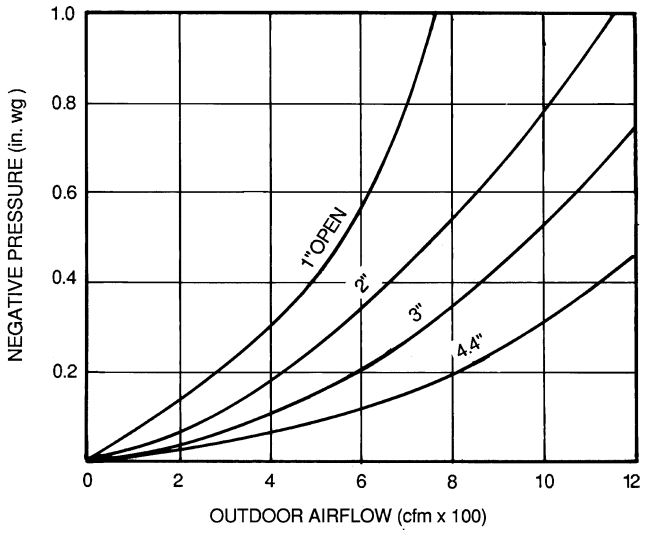


Fig. 19 — Position Setting

Assembly

1. Determine if ventilation air is required in building. If so, determine the minimum amount to be supplied by each unit and record quantity of ventilation air needed for use in Step 7.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove filter access panel. Remove outdoor-air opening panel. Save panels and screws. See Fig. 20. Remove optional outdoor-air damper hood package from filter section.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 21. Install seal strips on hoop top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
4. On 120 and 150 units, install vertical discharge block-off plate on right side over return air duct opening. See Fig. 22.

   Remove screw and discard from barometric relief damper.

NOTE: Be sure to engage rear economizer flange under tabs at rear of vertical return-air opening.

5. To convert to horizontal discharge application:
   a. Rotate the economizer 90 degrees until the economizer motor faces the condenser section (see Fig. 23).
   b. Rotate the barometric relief damper hinge 90 degrees. Barometric relief damper should open vertically to operate properly.
   c. Install horizontal discharge block-off plate over the opening on the access panel. (Block-off plate MUST be installed before installing hood assembly.) See Fig. 24.
6. Insert economizer plug into economizer harness. Remove tape and screw from barometric relief damper. See Fig. 25.
7. If ventilation air is not required, proceed to Step 8. If ventilation air is required, determine the minimum position setting for required airflow. See Fig. 26. Adjust minimum position setting by loosening the screws on the position setting bracket. See Fig. 27. Slide bracket until the top screw is in the position determined by Fig. 26. Tighten screws.
8. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 28. Make sure OAT terminals are positioned up.
9. Replace outdoor-air opening panel using screws from Step 2. Replace filter access panel. Ensure the filter access panel slides along the tracks and is securely engaged.

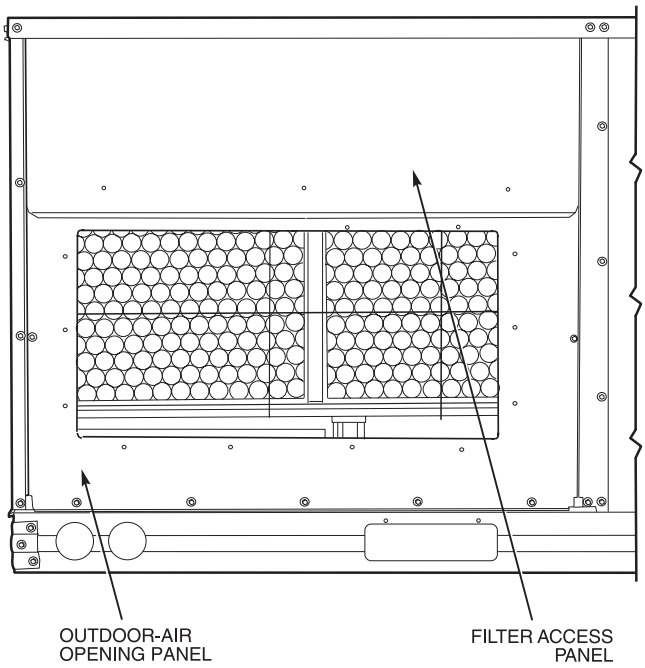
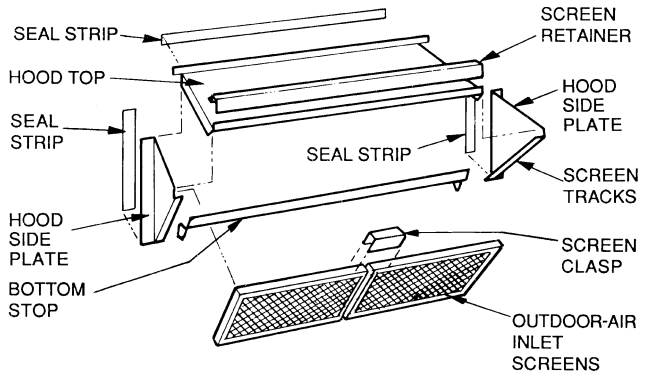


Fig. 20 — Panel Locations



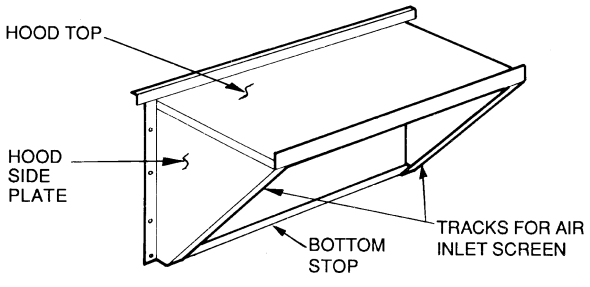


Fig. 21 — Outdoor-Air Hood Details

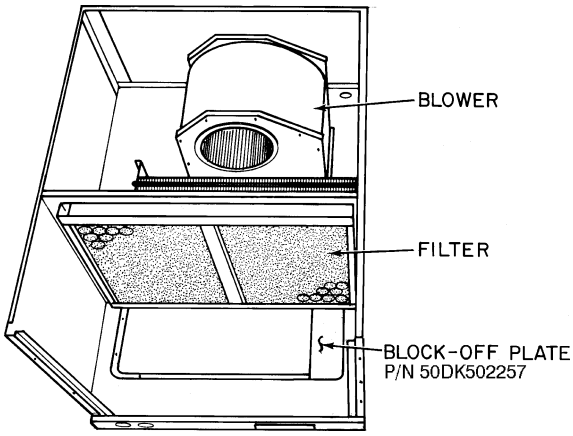


Fig. 22 — Vertical Discharge Block-Off Plate (Sizes 120,150 Only

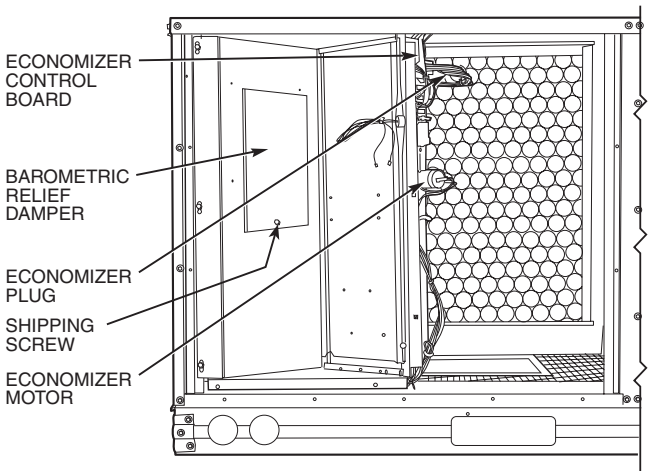


Fig. 23 — Horizontal Durablade Economizer Installation (90 Degree Rotation)

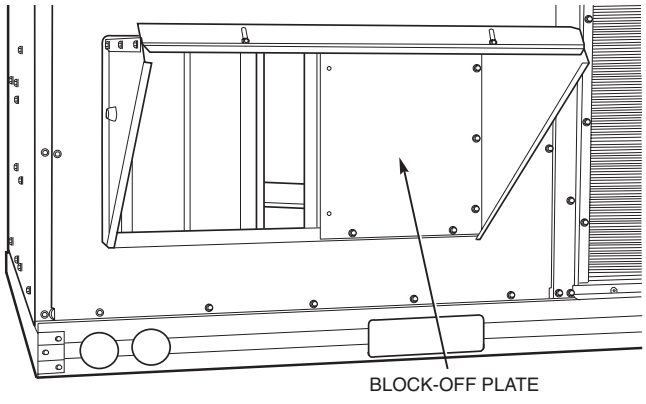


Fig. 24 — Horizontal Discharge Block-Off Plate

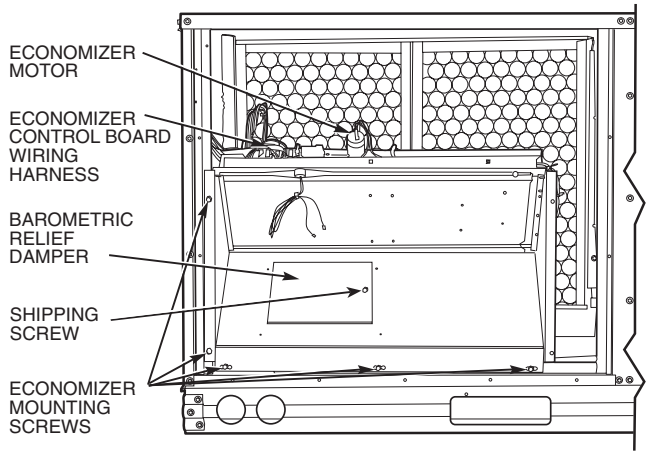
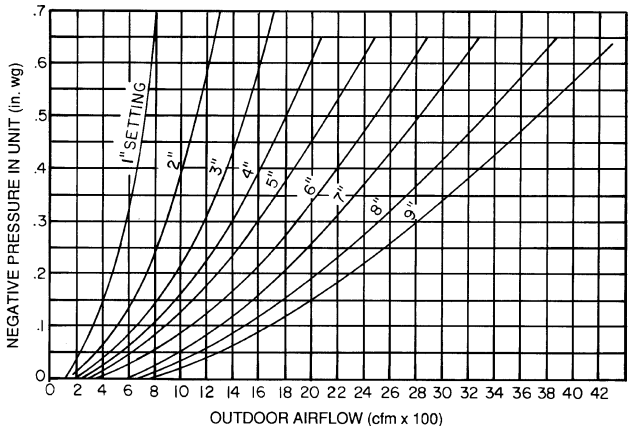


Fig. 25 — Durablade Economizer Installed in Unit



EXAMPLE:

Given — Negative Pressure . . . . . 0.1 in. wg

Outdoor Air . . . . . 1100 cfm

Determine — Setting =6

Fig. 26 — Durablade Economizer Minimum Position Setting

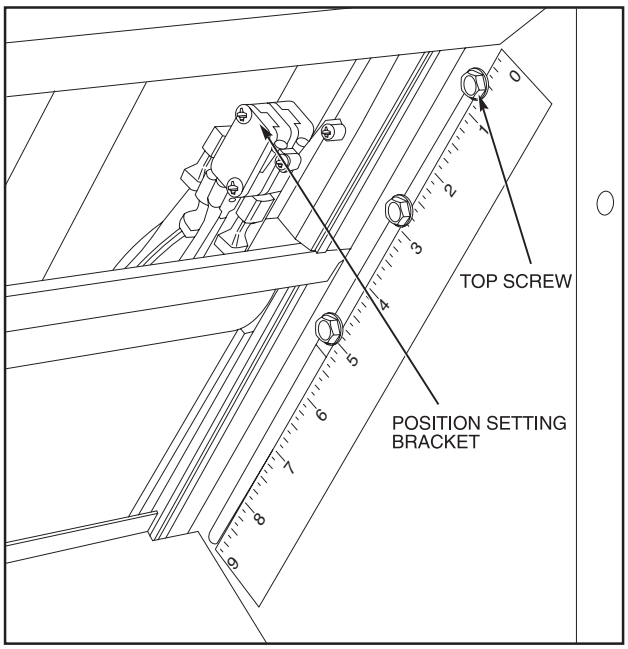
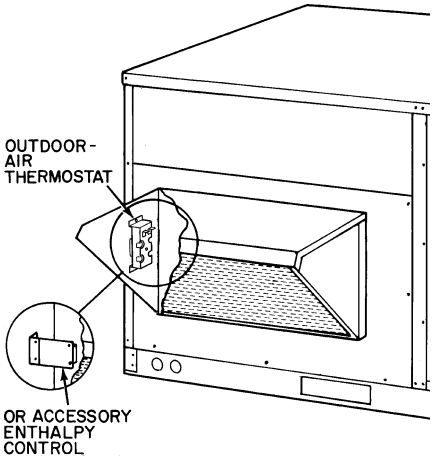
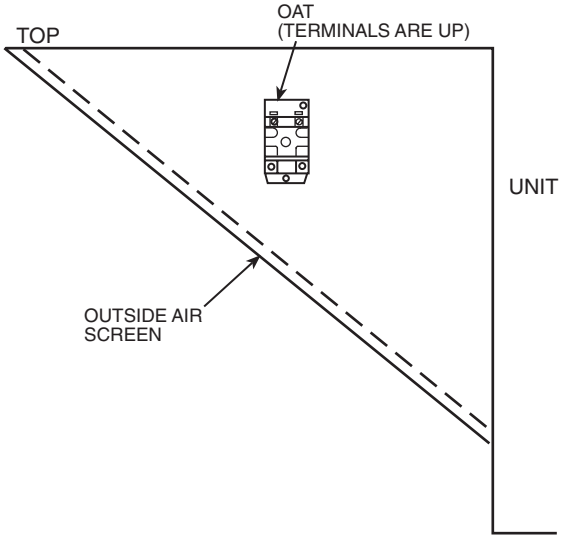


Fig. 27 — Durablade Economizer Minimum Position Damper Setting





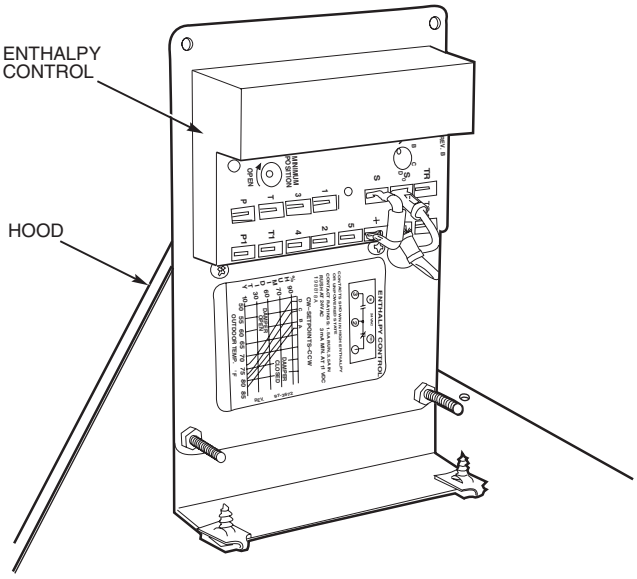


Fig. 28 — Outdoor-Air Thermostat/Enthalpy Control Installation

10. Fasten hood top and side plate assembly to outdoor-air opening panel with screws provided.
11. Place knob supplied with economizer on OAT. See Fig. 28. Set for 3° F below indoor room thermostat setting. If accessory enthalpy control (EC) is used in place of OAT, see instructions shipped with EC for installation and adjustment. See Fig. 28.
12. Connect OAT per Fig. 29.
13. Slide outdoor-air inlet screen into screen track on hood side plate. Slip screen clasp over screens to hold screens together. While holding screens in place, fasten screen retainer to hood using screws provided.

NOTE: Refer to Fig. 30 for economizer barometric relief damper characteristics.

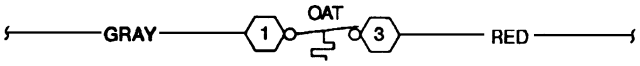


Fig. 29 — Wiring Connections for Outdoor-Air Thermostat

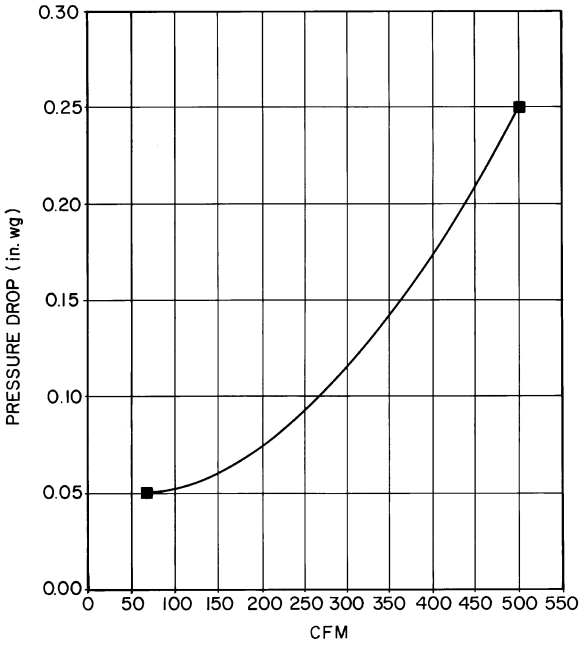


Fig. 30 — Durablade Economizer Barometric Relief Damper Characteristics

I. Optional EconoMi$er Economizer Installation

See Fig. 31 for EconoMi$er component locations.

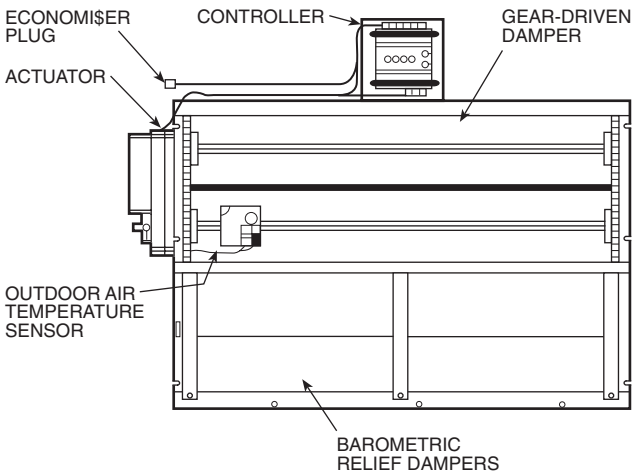


Fig. 31 — EconoMi$er Component Locations

1. To remove the existing unit filter access panel, raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. Remove the indoor coil access panel and discard. See Fig. 32.

   Controller should be mounted in vertical position as shown in Fig. 31.

2. Assemble the hood assembly as follows:

   Remove the EconoMi$er hood from its packaging. Locate the outdoor air opening panel. See Fig. 33. Remove the hood assembly shipping brackets located on the back (sloped) side of the EconoMi$er assembly. These brackets are used to retain the hood assembly during shipping only.

3. Install the $^1/_8$ x $^3/_4$ in. seal strip on the exhaust air hood side panels and the bottom bracket. Assemble the exhaust air hood to the outdoor air opening panel as shown in Fig. 33, using the screws provided. *Do not attach hood assembly to unit at this time.*

4. Install the $^1/_8$ x $^3/_4$ in. seal strip on the outdoor air hood top and side panels. Assemble the outdoor air hood to the outdoor air opening panel as shown in Fig. 34, using the screws provided. *Do not attach hood assembly to the unit at this time.*

5. Slide the outdoor air inlet screens into the screen track on the hood side panels. While holding the screens in place, fasten the screen retainer to the hood using the screws provided. Repeat the process for the barometric exhaust air screen. *Do not attach completed (Fig. 35) hood assembly to unit at this time.*

6. Install the return air block-off plate over the return air duct opening. See Fig. 36.

7. Slide the EconoMi$er assembly into the rooftop unit. See Fig. 37 and 38.

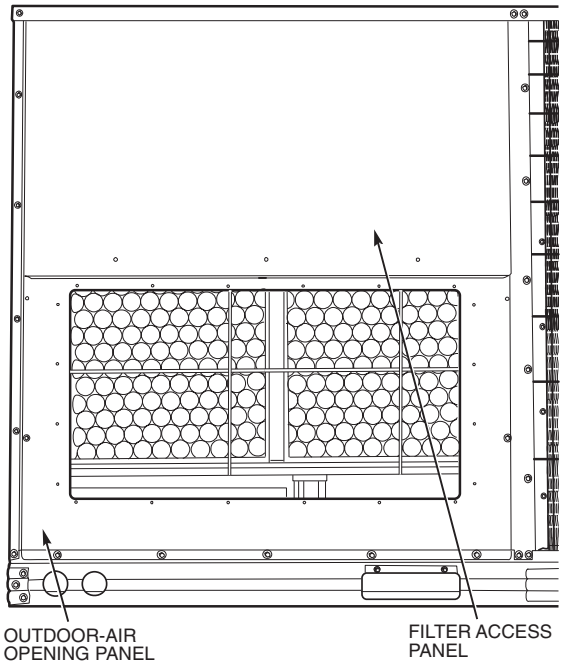


Fig. 32 — Typical Access Panel Locations

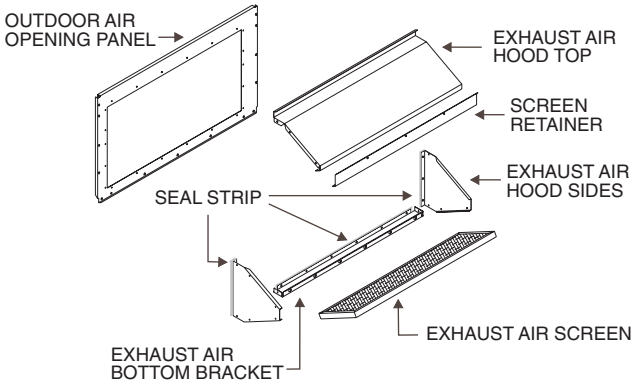


Fig. 33 — Exhaust Air Hood Assembly

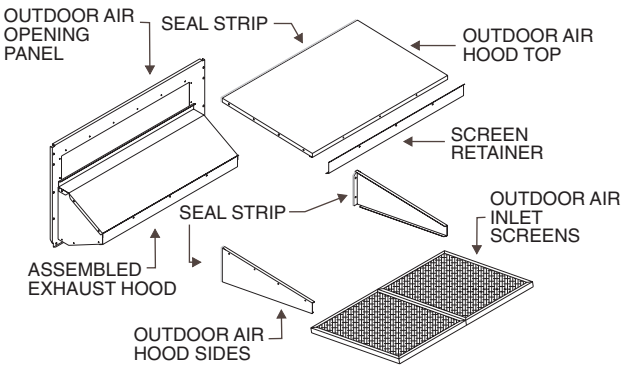


Fig. 34 — Outdoor Air Hood Assembly

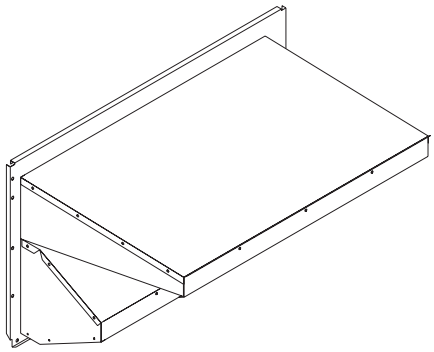


Fig. 35 — Completed Hood Assembly

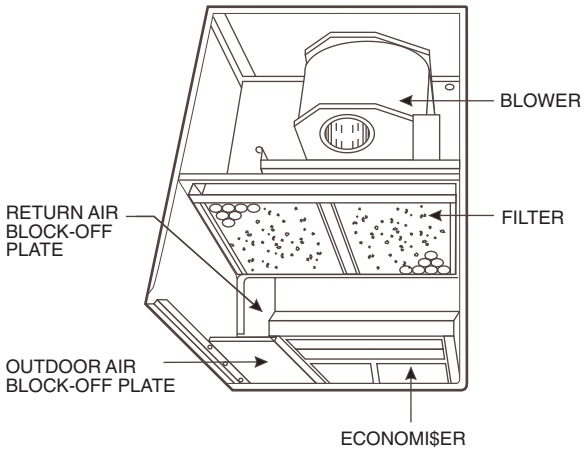


Fig. 36 — Return Air Block-Off Plate Installation

NOTE: Be sure to engage rear EconoMi$er flange under tabs in return air opening of the unit base. See Fig. 37.

8. Install the outdoor air block-off plate, then secure the EconoMi$er with the screws provided. See Fig. 36 and 38.
9. Remove and discard the 12-pin jumper plug from the unit wiring harness located in the upper left corner and insert the EconoMi$er plug into the unit wiring harness. Refer to wiring diagram Fig. 39 and 40. Also refer to Fig. 41 if installing an accessory power exhaust.
10. Install the complete hood assembly on the unit and secure using the screws provided.
11. Remove the indoor fan motor access panel.
12. Mount the supply air temperature sensor to the lower left portion of the indoor blower housing with the two (2) screws provided (see Fig. 42). Connect the violet and pink wires to the corresponding connections on the supply air temperature sensor. Replace the indoor fan motor access panel.

CO_2 Control Setup

If a CO_2 sensor is not being used, proceed to the next section. If a CO_2 sensor is being used, perform the following:

1. Determine the value at which you want the minimum position of the dampers to begin opening to allow a greater amount of outdoor air to enter. The range is 800 to 1,400 ppm.
2. Locate the CO_2 SP (PPM) potentiometer and adjust to the desired set point. See Fig. 43.

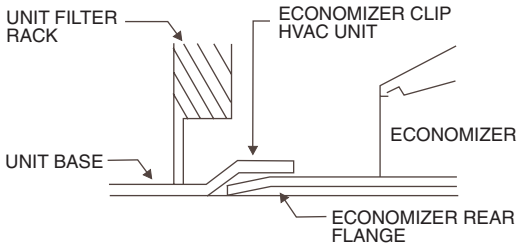


Fig. 37 — Rear EconoMi$er Flange Installation

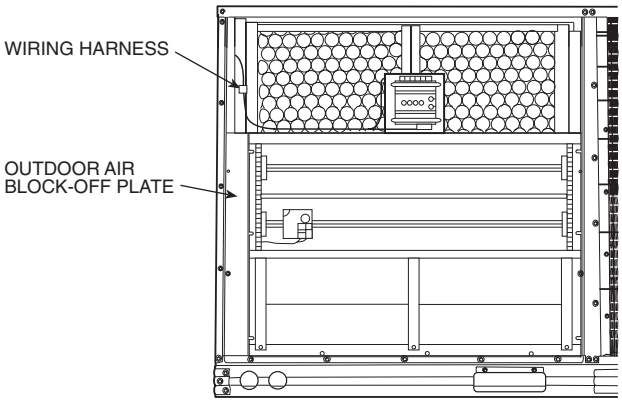
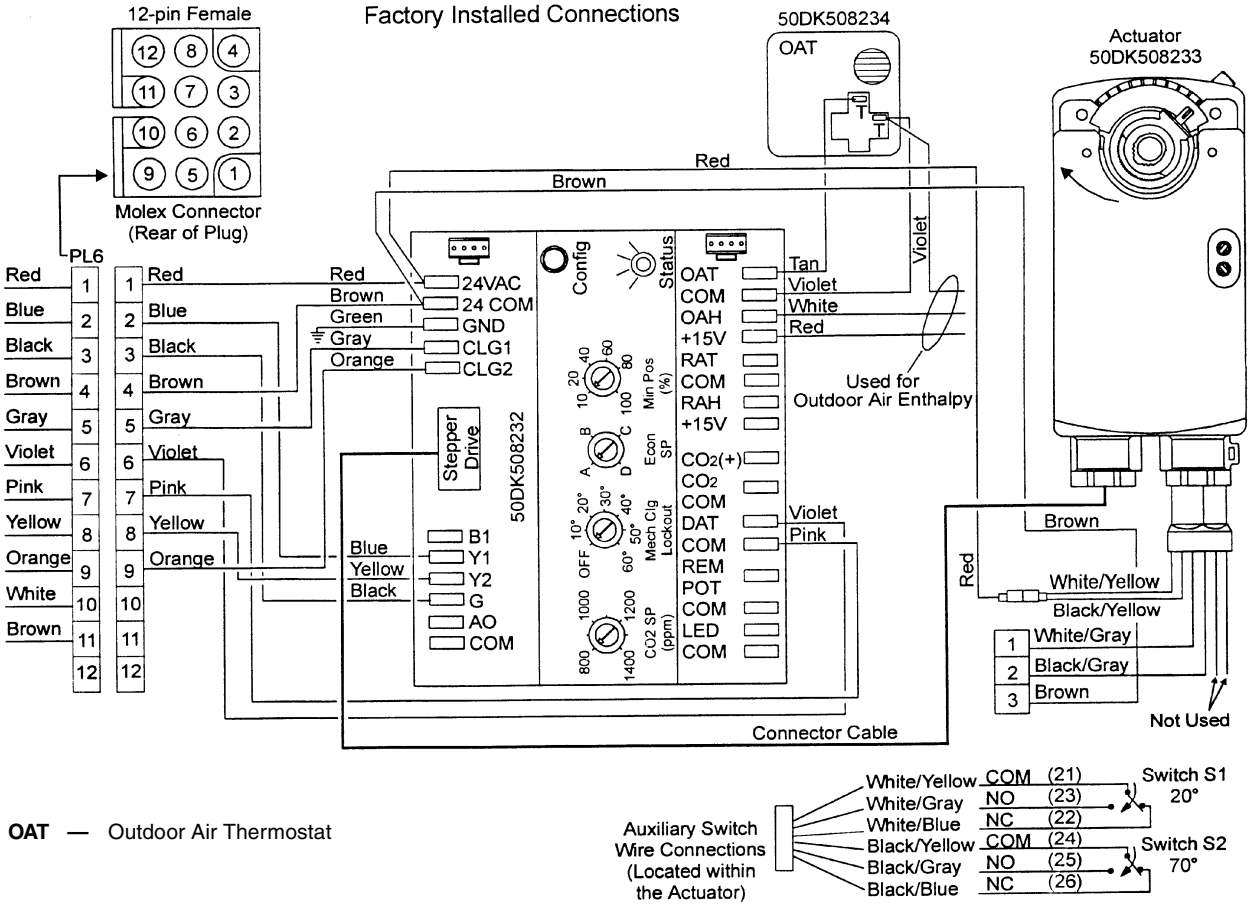


Fig. 38 — EconoMi$er Installed



OAT — Outdoor Air Thermostat

Fig. 39 — EconoMi$er Wiring

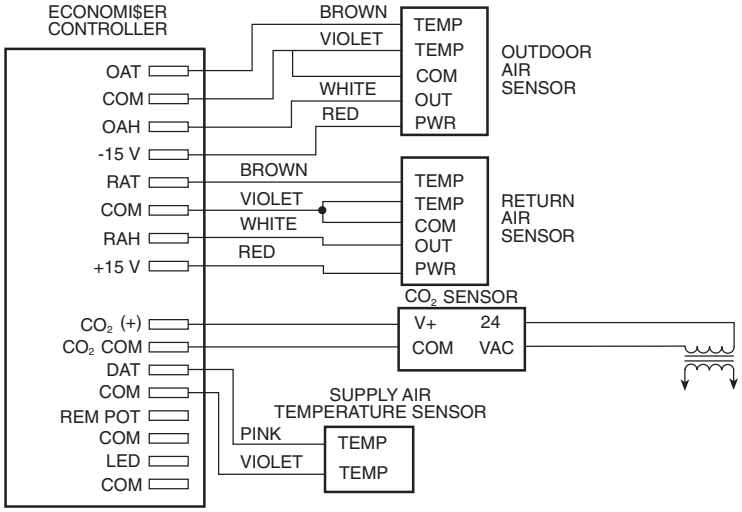


Fig. 40 — EconoMi$er Sensor Wiring

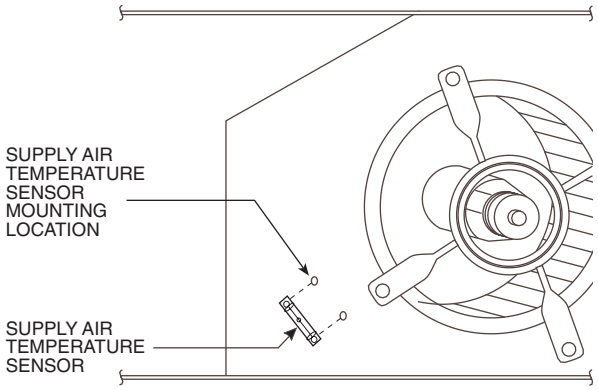


Fig. 42 — Supply Air Sensor Placement

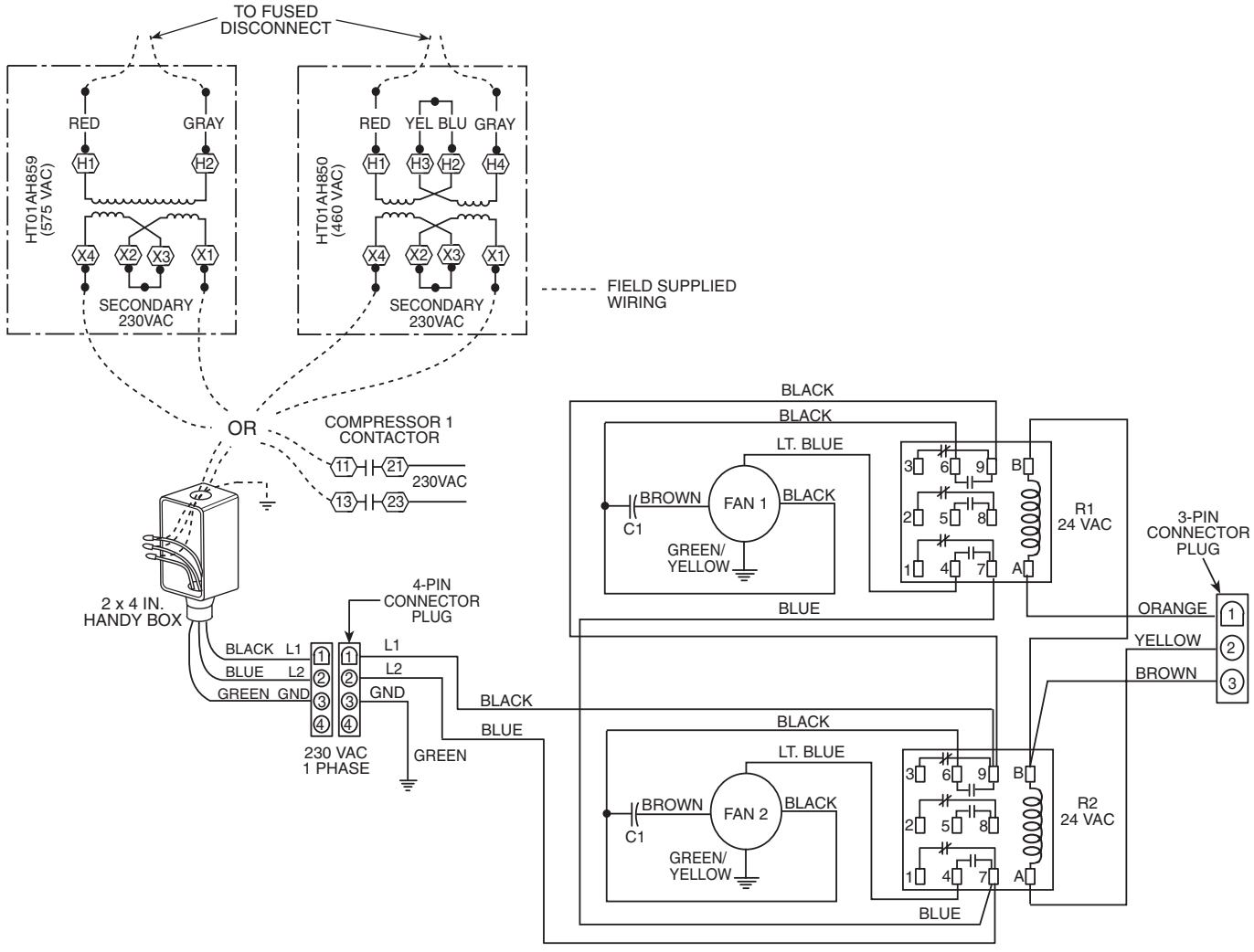


Fig. 41 — Wiring Diagram for Power Exhaust System

Mechanical Cooling Lockout

Determine the outdoor-air temperature at which you want the mechanical cooling (compressors) to be disabled. Locate the mechanical cooling lockout (MECH CLG LOCKOUT) potentiometer. To disable this feature, turn the potentiometer counterclockwise (CCW) to the OFF position. Otherwise, set the value between 10 and 60 F. Mechanical cooling will not operate when the outdoor air temperature is below this value. See Fig. 43.

Dry Bulb Changeover Set Up

Determine the dry bulb changeover set point from Table 4. The settings are A, B, C and D. Locate the ECON SP potentiometer and set the dry bulb changeover set point. See Fig. 43. When the OAT is above this set point, the damper is limited to minimum position setting.

Table 4 — Changeover Set Points

SETTINGS	A	B	C	D
Dry Bulb (°F)	73	69	66	63
Single Enthalpy* (Btu/lb)	27	25	24	22
Differential Temperature* (°F, Not Adjustable)	2	2	2	2
Differential Enthalpy* (Btu/lb, Not Adjustable)	1	1	1	1

*Field-installed accessory.

If a potentiometer fails, its setting will default to the values in Table 5.

Table 5 — Default Potentiometer Settings

POTENTIOMETER	DEFAULT SETTING
CO_2 SP (PPM)	1,000
MECH CLG LOCKOUT	47°
ECON SP	D
MIN POS (%)	20

Ventilation Air (Minimum Position Set Up)

If ventilation air is not required, proceed to Step 5. If ventilation air is required, perform the following:

1. The indoor fan must be on to set the ventilation air. Either put the thermostat in the continuous fan mode or jumper the R and G terminals at the rooftop unit connection board.
2. Locate the minimum position (MIN POS) potentiometer. Turn the potentiometer full CCW to fully close the outdoor air dampers. Turn the potentiometer gradually clockwise (CW) to the desired position. See Fig. 43.
3. Replace the filter access panel. See Fig. 32. Ensure the filter access panel slides along the tracks and is securely engaged.
4. Calculate the minimum airflow across the EconoMi$er.
   a. Calculate % of outside air using the following formula.

      % Outdoor air through EconoMi$er

      $$\% \text{ Outdoor air} = \frac{\text{Mixture Temp} - \text{Return Air Temp}}{\text{Outdoor Temp} - \text{Return Air Temp}}$$

   b. Divide total CFM by percentage outdoor air, this gives outdoor air volume in CFM.
5. Turn on base unit power.

NOTE: The EconoMi$er begins operation three minutes after power up.

⚠ **WARNING: Personal Injury Hazard.** Avoid possible injury by keeping fingers away from damper blades.

See Fig. 44 for barometric relief damper characteristics.

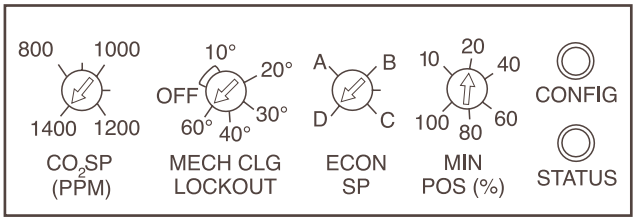


Fig. 43 — EconoMi$er Control Adjustment Potentiometers (Factory Settings)

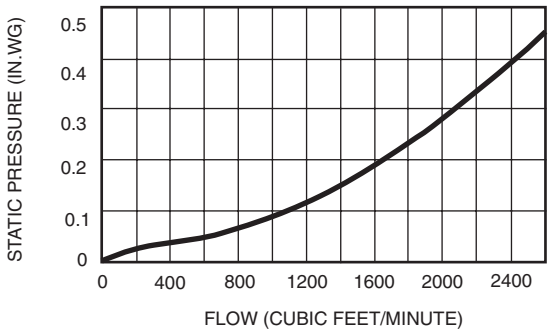


Fig. 44 — Barometric Relief Capacity

PRE-START-UP

⚠ **WARNING:** Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources have been disconnected and lockout tags installed.
4. Relieve all pressure from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off gas supply and *then* electrical power to unit.
   b. Relieve all pressure from system.
   c. Cut component-connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to or shipped with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution. If refrigerant leak is detected, see Service, Refrigerant Leaks section on page 33.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight. Ensure that no electrical wiring is in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:

⚠ **DANGER:** Do not purge gas supply into the combustion chamber. Do not use a match or other open flame to check for gas leaks. Failure to adhere to this warning could result in an explosion causing personal injury or death.

   a. Make sure that gas supply has been purged, and that all gas piping has been checked for leaks.
   b. Make sure that condenser-fan blade is correctly positioned in fan orifice. *Blades should clear fan motor.*
   c. Make sure that air filters are in place.
   d. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   e. Make sure that all tools and miscellaneous loose parts have been removed.
5. Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts. On size 150 units, remove the tiedown bands that hold the compressors together.
6. Each unit system has 4 Schrader-type gage ports: one on the suction line, one on the liquid line and two on the compressor discharge line. Be sure that caps on the ports are tight.

High Flow Valves

Located on the compressor hot gas and suction tubes are High Flow Valves. Large black plastic caps distinguish these valves with o-rings located inside the caps. These valves cannot be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

Unit is now ready for initial start-up.

START-UP

I. HEATING SECTION START-UP AND ADJUSTMENTS

⚠ **CAUTION:** Complete the required procedures given in Pre-Start-Up section on page 20 before starting unit.

Do not jumper any safety devices when operating the unit.

Ensure that burner orifices are aligned properly. Unstable operation may occur when the burner orifices in the manifold are misaligned.

Follow the lighting instructions on the heating section operation label (located inside the burner access door) to start the heating section.

NOTE: When lighting the unit for the first time, perform the following additional steps: If the gas supply pipe was not purged before connecting the unit, it will be full of air. It is recommended that the ground joint union be loosened and the supply line be allowed to purge until the odor of gas is detected. Never purge gas lines into a combustion chamber. Immediately upon detection of gas odor, retighten the union. Allow 5 minutes to elapse, then light unit in accordance with Checking Heating Control Operation section below.

A. Checking Heating Control Operation

Start and check the unit for proper heating control operation as follows: (Also see furnace lighting instructions located inside the burner access panel.)

1. Turn on unit electrical supply and manual gas valve.
2. Set system switch selector at HEAT position and fan switch at AUTO. or ON position. Set heating temperature lever above room temperature.
3. The induced-draft motor will start immediately.
4. After a call for heating, the main burners should light within 5 seconds. If the burner does not light, then there is a 22-second delay before another 5-second try. If the burner still does not light, the time delay is repeated. If the burner does not light within 15 minutes there is a lockout. To reset the control, break the 24-v power to W1. See note.

NOTE: The default value for the evaporator-fan motor ON/OFF delay is 45 seconds. The Integrated Gas Unit Controller (IGC) modifies this value when abnormal limit switch cycles occur. Based upon unit operating conditions, the ON delay can be reduced to 0 seconds and the OFF delay can be extended to 180 seconds.

When one flash of LED is observed, the evaporator-fan ON/OFF delay has been modified. If the limit switch trips at the start of the heating cycle during the evaporator ON delay, the time period of the ON delay for the next cycle will be 5 seconds less than the time at which the switch tripped.

EXAMPLE: If the limit switch trips at 30 seconds, the evaporator-fan ON delay for the next cycle will occur at 25 seconds.

To prevent short-cycling, a 5-second reduction will only occur if a minimum of 10 minutes has elapsed since the last call for heating.

The evaporator-fan OFF delay can also be modified. Once the call for heating has ended, there is a 10 minute period during which the modification can occur. If the limit switch trips during this period, the evaporator-fan OFF delay will increase by 15 seconds. A maximum of 9 trips can occur, extending the evaporator-fan OFF delay to 180 seconds. To restore the original default value, reset the power to the unit.

5. The evaporator fan will turn on 45 seconds after a call for heating.
6. The evaporator fan will turn off 45 seconds after thermostat temperature has been satisfied.
7. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate.

To shut off unit, set system selector switch at OFF position or set heating selector lever below room temperature.

B. Gas Input

Check gas input and manifold pressure in "HIGH FIRE" (W1 and W2 energized at gas valve) after unit start-up (see Table 6). If adjustment is required, proceed as follows:

⚠ **CAUTION:** These units are designed to consume the rated gas inputs using the fixed orifices at specified manifold pressures as shown in Table 6. DO NOT REDRILL THE ORIFICES UNDER ANY CIRCUMSTANCES.

The rated gas inputs shown in Table 6 are for altitudes from sea level up to 2000 ft above sea level. These inputs are based on natural gas with a heating value of 1050 Btu/ft^3 at 0.65 specific gravity, or LP (liquid propane) gas with a heating value of 2500 Btu/ft^3 at 1.5 specific gravity. For elevations above 2000 ft, reduce input 4% for each 1000 ft above sea level. When the gas supply being used has a different heating value or specific gravity, refer to national and local codes, or contact your distributor or branch to determine the required orifice size. Refer to Table 7 for the correct orifice to use at high altitudes. Kits are available from your distributor.

C. Adjusting Gas Input

The gas input to the unit is determined by measuring the gas flow at the meter or by measuring the manifold pressure. Measuring the gas flow at the meter is recommended for natural gas units. The manifold pressure must be measured to determine the input of LP gas units.

NOTE: When observing manifold pressure on 2-stage units, set unit for high fire.

Measuring Gas Flow at Meter Method — Natural Gas Units

Minor adjustment can be made by changing the manifold pressure. The manifold pressure must be maintained between 3.2 and 3.8 in. wg (when measured under high fire on 2-stage units). If larger adjustments are required, change main burner orifices following the recommendations of national and local codes.

NOTE: All other appliances that use the same meter must be turned off when gas flow is measured at the meter. Proceed as follows:

1. Turn off gas supply to unit.
2. Remove pipe plug on outlet of gas valve or on manifold.
3. Connect manometer.
4. Turn on gas to unit.
5. Record number of seconds for gas-meter test dial to make one revolution.
6. Divide number of seconds in Step 5 into 3600 (number of seconds in one hour).
7. Multiply result of Step 6 by the number of cubic ft shown for one revolution of test dial to obtain cubic ft of gas flow per hour.
8. Multiply result of Step 7 by Btu heating value of gas to obtain total measured input in Btuh. Compare this value with heating input shown in Table 1. (Consult the local gas supplier if the heating value of gas is not known.)

EXAMPLE: Assume that the size of test dial is one cubic ft, one revolution takes 30 seconds and the heating value of the gas is 1045 Btu/ft^3.

Proceed as follows:

1. 30 seconds to complete one revolution
2. 3600 ÷ 30 = 120
3. 120 x 1 = 120 ft^3 of gas flow/hr
4. 120 x 1045 = 125,400 Btuh input

If the desired gas input is 125,000 Btuh, only a minor change in the manifold pressure is required.

Observe manifold pressure and proceed as follows to adjust gas input:

1. Remove cover screw over regulator adjustment screw on gas valve. See Fig. 45.
2. Turn regulator adjustment screw clockwise to increase gas input, or counterclockwise to decrease input. Manifold pressure must be between 3.2 and 3.8 in. wg.

⚠ **WARNING:** Unsafe operation of the unit may result if manifold pressure is outside this range. Personal injury or unit damage may result.

3. Replace cover screw cap on gas valve.
4. Turn off gas supply to unit.
5. Remove manometer from pressure tap.
6. Replace pipe plug on gas valve or manifold.
7. Turn on gas to unit.
8. Check for leaks.

Table 6 — Rated Gas Inputs at Indicated Manifold Pressures

UNIT	NUMBER OF ORIFICES	GAS SUPPLY PRESSURE (in. wg)				MANIFOLD PRESSURE (in. wg)*		NATURAL GAS		LIQUID PROPANE**	
		Natural		Propane				Orifice Drill Size	Heating Input (Btuh)†	Orifice Drill Size	Heating Input (Btuh)†
		Min	Max	Min	Max	Natural	Propane				
580D090-150	3	4.0	13.0	5.0	13.0	3.5	3.5	31	125,000††	41	125,000††
	4	4.0	13.0	5.0	13.0	3.5	3.5	31	180,000¶	41	180,000¶
	5	4.0	13.0	5.0	13.0	3.5	3.5	31	220,000	41	220,000
580D120, 150	5	4.0	13.0	5.0	13.0	3.5	3.5	30	250,000	38	250,000

LEGEND

LP — Liquid Propane

*Manifold pressure shown is for second stage of heat when energized.

†Maximum heating input based on altitudes from sea level up to 2000 ft above sea level. For altitudes above 2000 ft, reduce input rating 4% for each 1000 ft above sea level. In Canada, from 2000 ft above sea level to 4500 ft above sea level, derate the unit 10%.

**When a 580D unit is converted to LP, the burners must be modified with accessory LP kit.

††580D090,102 only.

¶580D090-120 only.

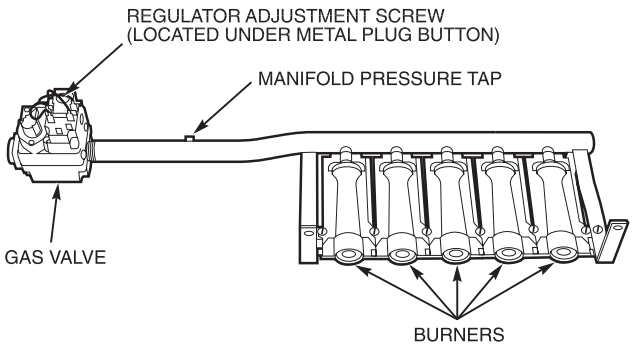


Fig. 45 — Burner Tray Details

Table 7 — Altitude Compensation*

ELEVATION (FT)	125,000, 180,000, AND 220,000 BTUH NOMINAL INPUT		250,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	31	41	30	38
2,000	32	42	30	39
3,000	32	42	31	40
4,000	32	42	32	41
5,000	33	43	33	42
6,000	34	43	34	43
7,000	35	44	35	43
8,000	36	44	36	44
9,000	37	45	37	44
10,000	38	46	38	45
11,000	39	47	39	45
12,000	40	47	40	46
13,000	41	48	41	47
14,000	42	48	42	47

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

†Orifices available through your local distributor.

Measuring Manifold Pressure — LP Gas Units

The main burner orifices on an LP gas unit are sized for the unit rated input when the manifold pressure is 3.5 in. wg.

Proceed as follows to adjust gas input on an LP gas unit:

1. Turn off gas to unit.
2. Remove pipe plug on outlet of gas valve or on manifold.
3. Connect manometer.
4. Turn on gas to unit and ensure gas valve operation in second stage.
5. Remove cover screw over regulator adjustment screw on gas valve. See Fig. 45.
6. Adjust regulator adjustment screw for a manifold pressure reading of 3.5 in. wg (when observed under high fire on 2-stage units). Turn adjusting screw clockwise to increase manifold pressure, or counterclockwise to decrease manifold pressure.
7. Replace cover screw.
8. Turn off gas to unit.
9. Remove manometer from pressure tap.
10. Replace pipe plug on gas valve or manifold.
11. Turn on gas to unit.
12. Check for leaks.

D. Check Burner Flame

Observe the unit heating operation, and watch the burner flames through the access door to see if they are light blue in appearance, and that the flames are approximately the same for each burner. See Fig. 46.

E. Airflow and Temperature Rise

The heating section of each side of the unit is designed and approved for heating operation within the temperature rise range stamped on the unit rating plate. Temperature rise range is also found in Table 1.

The heating operation airflow must produce a temperature rise that falls within the approved range.

Refer to Section III, Indoor Airflow and Airflow Adjustments on page 26 of this section to adjust heating airflow.

F. Safety Check of Limit Control

Limit control is located on the deck next to the indoor-air blower. The control shuts off the gas supply if the unit overheats.

The recommended method of checking this limit control is to gradually block off the return air after the unit has been operating in heating for a period of at least 5 minutes. As soon as the limit control functions, the return-air opening should be unblocked to permit normal air circulation. By using this method to check the limit control, it can be established that the limit is functioning properly and the unit will "fail-safe" if there is a restricted circulating-air supply or motor failure. If the limit control does not function during this test, the cause must be determined and corrected.

G. Heating Sequence of Operation

Heating, Units Without Economizer

When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least one minute when W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay.

Heating, Units With Economizer

When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least one minute when

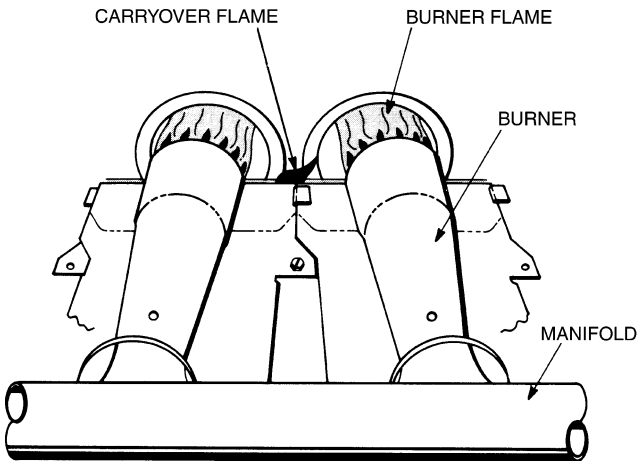


Fig. 46 — Monoport Burners

W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited and the damper moves to the minimum position. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay. The economizer damper then moves to the fully closed position. When using continuous fan, the damper will remain in the minimum position.

H. Limit Switches

Heating limit switches (LS) close the gas valve and the Integrated Gas Unit Controller (IGC) if the leaving-air temperature exceeds the maximum allowable temperature.

Normally closed LS completes a circuit to the gas valve. Should the leaving-air temperature rise above the maximum allowable temperature, LS opens instantly, closing the gas valves and stopping gas flow to the burners. The inducer motor and evaporator motor are energized to cool heat exchanger. The combustion blower motor stops.

When the air temperature at LS drops to the low-temperature setting of the LS, the switch closes and completes the gas valve circuit. The electric-spark ignition system cycles and the unit returns to normal heating operation.

I. Rollout Switch

The rollout switch (RS) is a temperature-actuated automatic reset switch which closes the main gas valve in the event of flame rollout. The switch is located above the main burners on the internal wind baffle. When the temperature at RS reaches the maximum allowable temperature, the control circuit trips, closing the gas valves and stopping gas flow to the burners. The inducer motor and evaporator-fan motor are energized when RS trips. Although the rollout switch has an automatic reset, the Integrated Gas Unit Controller (IGC) locks out the unit when a trip occurs and does not allow the burners to ignite until the unit disconnect is reset. If the switch cycles again, shut down the unit and call for service.

II. COOLING SECTION START-UP AND ADJUSTMENTS

⚠ **CAUTION:** Complete the required procedures given in the Pre-Start-Up section on page 20 before starting the unit.

Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 25 F.

Do not rapid-cycle the compressor. Allow 5 minutes between "on" cycles to prevent compressor damage.

A. Checking Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that fan motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO. position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO. position. Set cooling control below room temperature. Observe that compressor, condenser fan, and evaporator-fan motors start. Observe that cooling cycle shuts down when control setting is satisfied.
3. When using an autochangeover room thermostat, place both SYSTEM and FAN switches in AUTO. positions. Observe that unit operates in heating mode when temperature control is set to "call for heating" (above room temperature) and operates in cooling mode when temperature control is set to "call for cooling" (below room temperature).

B. Checking and Adjusting Refrigerant Charge

The refrigerant system is fully charged with R-22 refrigerant, tested, and factory-sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge. This unit uses charging charts to determine proper charge. See Refrigerant Charge section on page 33 for further details.

C. Unit Controls

All compressors have the following internal-protection controls:

1. *High-Pressure Relief Valve* — This valve (internal to the compressor) opens when the pressure differential between the low and high side becomes excessive and will automatically reset when pressure returns to normal.
2. *Compressor Overload* — This overload interrupts power to the compressor when either the current or internal temperature becomes excessive, and automatically resets when the internal temperature drops to a safe level. This overload may require up to 60 minutes (or longer) to reset; therefore, if the internal overload is suspected of being open, disconnect the electrical power to the unit and check the circuit through the overload with an ohmmeter or continuity tester.

D. Compressor Rotation

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit and tag disconnect.
3. Reverse any two of the unit power leads.
4. Reapply power to the unit.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

E. Cooling Sequence of Operation

Without Economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) compressor contactor no. 1 (C1) and outdoor (condenser) fan contactor (OFC) are energized and indoor (evaporator) fan motor

(IFM), compressor no. 1, and condenser fan start. The outdoor (condenser) fan motors (OFM) run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor con-tactor no. 2 (C2) is energized and compressor no. 2 starts. When the thermostat is satisfied, C1 and C2 are deenergized and the compressor and OFM shut off. After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the ON position, the IFM will run continuously.

With Durablade Economizer

When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and outdoor fan contactor (OFC) energizes starting the condenser fan. The evaporator-fan motor is energized and the economizer damper moves to the minimum position. After the thermostat is satisfied, there is a 30-second delay before the evaporator fan turns off. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisfied, the damper moves to the fully closed position when using an auto. fan or to the minimum position when using a continuous fan.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 57 F, contact T2 on the supply-air thermostat (SAT) will close. The damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 52 F.

When the supply-air temperature falls to between 57 F and 52 F, contactor T2 and T1 on the SAT will open and the damper will remain at an intermediate open position. If the supply-air temperature falls below 52 F, contactor T1 on the SAT will close. The damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 52 F. When the thermostat is satisfied, the damper will move to the fully closed position when using an auto. fan or to the minimum position when using a continuous fan.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing a second-stage cooling. Compressor no. 1 and the condenser fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and condenser-fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, there is a 30-second delay before the evaporator fan shuts off. The damper moves to the fully closed position when using an auto. fan or the minimum position when using a continuous fan.

Additional information on economizer operation is provided in the Ventilation Sequence section on page 31.

Cooling, Units with EconoMi$er

When the Outdoor Air Temperature (OAT) is above the ECON SP set point and the room thermostat calls for Stage 1 cooling (R to G + Y1), the indoor-fan motor (IFM) is energized and the EconoMi$er damper modulates to minimum position. The compressor contactor OFC are energized to start the compressor and outdoor-fan motor (OFM). After the thermostat is satisfied, the damper modulates to the fully closed position when the IFM is deenergized.

When the OAT is below the ECON SP setting and the room thermostat calls for Stage 1 cooling (R to G + Y1), the EconoMi$er modulates to the minimum position when the IFM is energized. The EconoMi$er provides Stage 1 of cooling by modulating the return and outdoor-air dampers to maintain a 55 F supply air set point. If the supply-air temperature (SAT) is greater than 57 F, the EconoMi$er modulates open, allowing a greater amount of outdoor air to enter the unit. If the SAT drops below 53 F, the outdoor-air damper modulates closed to reduce the amount of outdoor air. When the SAT is between 53 and 57 F, the EconoMi$er maintains its position.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, and the OAT is above the MECH CLG LOCKOUT set point, the EconoMi$er integrates free cooling with mechanical cooling. This is accomplished by the strategies below.

NOTE: Compressors have a two-minute Minimum On, Minimum Off, and Interstage delay timer.

1. If Y1 is energized, and the room thermostat calls for Y2 (2-stage thermostat), the compressor number 1 and OFM are energized. The position of the EconoMi$er damper is maintained at its current value.
2. If Y1 is energized for more then 20 minutes, and Y2 is not energized (whether or not a 2-stage thermostat is used), compressor no. 1 and OFM are energized. The position of the EconoMi$er damper is maintained at its current value.
3. If Y1 is energized, and compressor no. 1 is already energized (see Step 2) and the room thermostat calls for Y2, compressor no. 1 continues to operate. If Y2 remains energized for more than 20 minutes, compressor no. 2 is energized.

NOTE: Compressor no. 2 cannot be energized unless there is a signal for Y2 from the space thermostat.

4. If compressor no. 2 is energized, and the Y2 signal from the thermostat is satisfied, compressor no. 1 and 2 are deenergized. Re-asserting Y2 will start compressor no. 1 and (after a 20-minute interstage delay) compressor no. 2.
5. If compressor no. 1 is energized and the thermostat is satisfied, compressor no. 1, the OFM, and IFM are deenergized and the EconoMi$er modulates closed.

When the OAT is below the MECH CLG LOCKOUT set point, the compressors remain off.

Time Guard® II Device

If the unit is equipped with accessory Time Guard II recycle timer, the unit will delay 5 minutes between compressor starts.

Controls Kit

Loss-of-Charge Switch (LPS) — When the refrigerant liquid line pressure drops below 7 psig, the LPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure reaches 22 psig, the switch resets and the compressor is allowed to come back on.

High-Pressure Switch (HPS) — When the refrigerant high-side pressure reaches 428 psig, the HPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure drops to 320 psig, the switch resets and the compressor is allowed to restart.

Freeze Protection Thermostat (FPT) — When the evaporator coil leaving-refrigerant temperature drops below 30 F, the FPT opens 24-v power to the compressor contactor and stops the compressor. When the leaving refrigerant temperature warms to 45 F, the switch resets and the compressor is allowed to restart.

III. INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

⚠ **CAUTION:** For cooling operation, the recommended airflow is 300 to 500 cfm per each 12,000 Btuh of rated cooling capacity. For heating operation, the airflow must produce a temperature rise that falls within the range stamped on the unit rating plate.

Adjust evaporator-fan RPM to meet jobsite conditions and temperature rise in Table 1. Table 8 shows fan rpm at motor pulley settings. Table 9 shows motor performance. Refer to Tables 10-17 to determine fan speed settings.

A. Belt Drive Motors

Fan motor pulleys are factory set for speed shown in Table 1.

NOTE: Before adjusting fan speed, make sure the new fan speed will provide an air-temperature rise range as shown in Table 1.

To change fan speed:

1. Shut off unit power supply and tag disconnect.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 47 and 48.
3. Loosen movable pulley flange setscrew (see Fig. 49).
4. Screw movable flange toward fixed flange to increase RPM and away from fixed flange to decrease RPM. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft.
3. Make angular alignment by loosening motor from mounting.

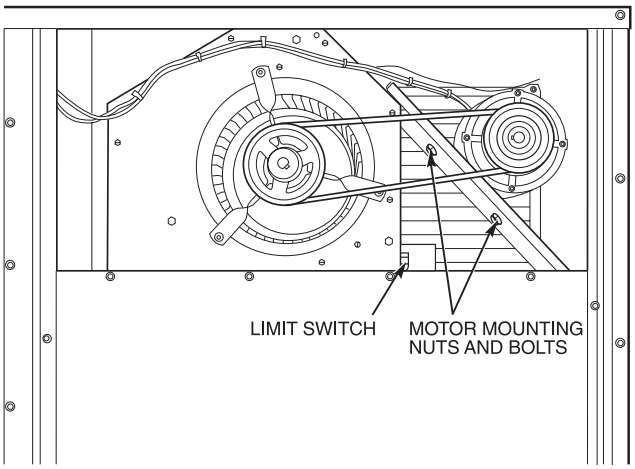


Fig. 47 — Typical Belt-Drive Motor Mounting for Sizes 090, 102

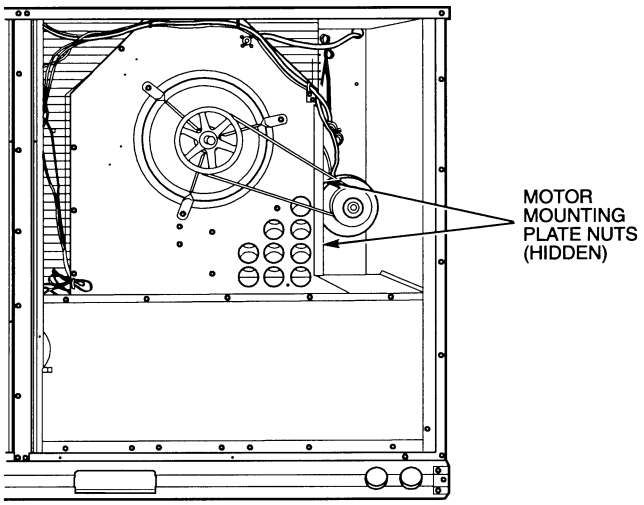


Fig. 48 — Typical Belt-Drive Motor Mounting for Sizes 102, 150

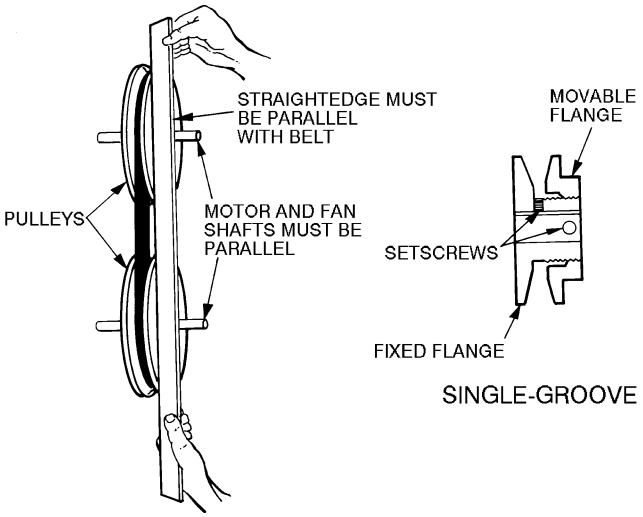


Fig. 49 — Evaporator-Fan Pulley Adjustment

To adjust belt tension:

1. Loosen fan-motor nuts.
2. Sizes 090, 102:
   Slide motor mounting plate away from fan scroll for proper belt tension ($^1/_2$-in. deflection with 8 to 10 lb. of force).
   Sizes 120, 150:
   Slide motor mounting plate downward to tighten belt tension ($^1/_2$-in. deflection with 8 to 10 lb. of force).
3. Tighten nuts.
4. Adjust bolt and nut on motor to secure motor in fixed position.
5. Verify pulleys are in correct alignment.

Table 8 — Fan Rpm at Motor Pulley Settings*

UNIT 580D	MOTOR PULLEY TURNS OPEN												
	0		1	1	2	2	3	3	4	4	5	5	6
090†	840	815	790	765	740	715	690	665	640	615	590	—	—
090**	935	910	885	860	835	810	785	760	735	710	685	—	—
102†	935	910	885	860	835	810	785	760	735	710	685	—	—
120†	935	910	885	860	835	810	785	760	735	710	685	—	—
120††	1085	1060	1035	1010	985	960	935	910	885	860	835	—	—
150†	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
150††	1260	1220	1185	1155	1130	1100	1075	1045	1015	990	960	930	900

*Approximate rpm shown.
**Indicates alternate drive.
†Indicates standard motor and drive.
††Indicates alternate motor and drive.

Table 9 — Motor Data

UNIT 580D	EVAPORATOR-FAN MOTOR	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
090	Std	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
102	Std	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
120	Std	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
	Alt	2.90	2615	208/230	8.6
				460	3.9
				575	3.9
150	Std	3.70	3313	208/230	12.2
				460	5.5
				575	5.5
	Alt	5.25	4400	208/230	17.3
				460	8.5
				575	8.5

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower and watts range of the motors can be utilized with confidence. Using your fan motors up to the ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 10 — 580D090 Air Delivery, Vertical Discharge Units

AIRFLOW (Cfm)	STANDARD BELT DRIVE MOTOR AND ALTERNATE BELT DRIVE																	
	External Static Pressure (in. wg)																	
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	**499**	**524**	**580**	**677**	652	867	717	1056	748	1165	779	1275	839	1578	905	1954	951	2266
2250	**507**	**547**	**586**	**700**	658	891	722	1097	752	1199	783	1301	843	1604	908	1989	955	2283
2350	**513**	**562**	592	723	663	916	727	1131	756	1224	786	1327	846	1630	910	2015	959	2300
2400	**528**	**600**	606	779	674	965	738	1199	766	1301	795	1404	853	1665	912	2041	967	2360
2500	**542**	**646**	619	835	686	1022	748	1258	777	1370	806	1491	859	1718	919	2093	971	2403
2550	**550**	**669**	627	867	692	1056	754	1292	783	1413	812	1543	864	1761	920	2110	974	2428
2600	**557**	**692**	634	891	698	1089	759	1327	787	1456	816	1587	868	1805	921	2136	976	2445
2700	**573**	**747**	648	956	711	1156	770	1404	798	1534	827	1665	878	1910	928	2162	983	2529
2800	**588**	**803**	662	1022	723	1233	782	1473	809	1613	837	1753	889	2023	937	2266	986	2554
2900	604	867	676	1089	737	1318	794	1560	821	1700	848	1840	900	2128	947	2377	993	2637
3000	620	932	690	1165	750	1404	806	1648	832	1788	849	1927	910	2223	958	2504	1002	2751
3100	636	1006	704	1241	764	1499	818	1744	844	1884	870	2023	920	2326	968	2620	1012	2870
3200	652	1089	718	1327	778	1595	831	1849	856	1980	882	2119	931	2428	979	2735	1023	3002
3300	668	1173	732	1413	793	1700	844	1954	869	2093	894	2232	942	2537	989	2839	1034	3121
3400	684	1258	747	1508	807	1805	857	2076	882	2206	907	2343	954	2645	1000	2948	1044	3237
3500	701	1361	762	1613	821	1910	871	2188	895	2326	919	2462	966	2751	1011	3062	1054	3340
3600	717	1465	777	1718	835	2023	885	2317	908	2453	932	2587	978	2870	1022	3165	1065	3445
3700	733	1569	792	1831	849	2136	899	2445	922	2579	945	2718	990	2987	1034	3272	1076	3544
3750	742	1630	800	1892	856	2197	907	2512	929	2653	952	2719	997	3055	1040	3333	1082	3609
3800	750	1683	807	1954	863	2257	914	2571	936	2847	958	2854	1003	3114	1045	3387	1087	3643
3900	767	1805	822	2076	877	2386	928	2702	950	2979	972	2987	1015	3244	1057	3495	1098	3733
4000	783	1927	838	2206	891	2512	942	2839	964	3187	986	3121	1028	3373	1070	3603	1110	3820
4100	800	2067	854	2343	905	2645	956	2971	978	3244	1000	3251	1042	3495	1082	3713	1122	3902
4200	817	2197	869	2479	920	2783	970	3099	992	3258	1015	3380	1055	3614	1095	3811	1134	3971
4250	826	2275	877	2554	928	2854	977	3165	999	3306	1022	3445	1062	3676	1102	3860	1140	4006
4300	834	2343	885	2629	935	2925	984	3230	1006	3313	1029	3508	1069	3728	1108	3906	1147	4036

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. indicates an alternate drive is required.
3. indicates a field-supplied motor and drive are required.
4. ——— indicates maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 11 — 580D102 Air Delivery, Vertical Discharge Units

AIRFLOW (Cfm)	STANDARD BELT DRIVE MOTOR																	
	External Static Pressure (in. wg)																	
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	**499**	**524**	**580**	**677**	**652**	**867**	717	1056	748	1165	779	1275	839	1578	905	1954	951	2266
2250	**507**	**547**	**586**	**700**	**658**	**891**	722	1097	752	1199	783	1301	843	1604	908	1989	955	2283
2300	**513**	**562**	**592**	**723**	**663**	**916**	727	1131	756	1224	786	1327	846	1630	910	2015	959	2300
2400	**528**	**600**	**606**	**779**	**674**	**965**	738	1199	766	1301	795	1404	853	1665	912	2041	967	2360
2500	**542**	**646**	**619**	**835**	686	1022	748	1258	777	1370	806	1491	859	1718	919	2093	971	2403
2550	**550**	**669**	**627**	**867**	692	1056	754	1292	783	1413	812	1543	864	1761	920	2110	974	2428
2600	**557**	**692**	**634**	**891**	698	1089	759	1327	787	1456	816	1587	868	1805	921	2136	976	2445
2700	**573**	**747**	**648**	**956**	711	1156	770	1404	798	1534	827	1665	878	1910	928	2162	983	2529
2800	**588**	**803**	**662**	**1022**	723	1233	782	1473	809	1613	837	1753	889	2023	937	2266	986	2554
2900	**604**	**867**	**676**	**1089**	737	1318	794	1560	821	1700	848	1840	900	2128	947	2377	993	2637
3000	**620**	**932**	690	1165	750	1404	806	1648	832	1788	849	1927	910	2223	958	2504	1002	2751
3100	**636**	**1006**	704	1241	764	1499	818	1744	844	1884	870	2023	920	2326	968	2620	1012	2870
3200	**652**	**1089**	718	1327	778	1595	831	1849	856	1980	882	2119	931	2428	979	2735	1023	3002
3300	**668**	**1173**	732	1413	793	1700	844	1954	869	2093	894	2232	942	2537	989	2839	1034	3121
3400	**684**	**1258**	747	1508	807	1805	857	2076	882	2206	907	2343	954	2645	1000	2948	1044	3237
3500	701	1361	762	1613	821	1910	871	2188	895	2326	919	2462	966	2751	1011	3062	1054	3340
3600	717	1465	777	1718	835	2023	885	2317	908	2453	932	2587	978	2870	1022	3165	1065	3445
3700	733	1569	792	1831	849	2136	899	2445	922	2579	945	2718	990	2987	1034	3272	1076	3544
3750	742	1630	800	1892	856	2197	907	2512	929	2653	952	2719	997	3055	1040	3333	1082	3609
3800	750	1683	807	1954	863	2257	914	2571	936	2847	958	2854	1003	3114	1045	3387	1087	3643
3900	767	1805	822	2076	877	2386	928	2702	930	2979	972	2987	1015	3244	1057	3495	1098	3733
4000	783	1927	838	2206	891	2512	942	2839	964	3187	986	3121	1028	3373	1070	3603	1110	3820
4100	800	2067	854	2343	905	2645	956	2971	978	3244	1000	3251	1042	3495	1082	3713	1122	3902
4200	817	2197	869	2479	920	2783	970	3099	992	3258	1015	3380	1055	3614	1095	3811	1134	3971
4250	826	2275	877	2554	928	2854	977	3165	999	3306	1022	3445	1062	3676	1102	3860	1140	4006
4300	834	2343	885	2629	935	2925	984	3230	1006	3313	1029	3508	1069	3728	1108	3906	1147	4036

NOTES:
1. **Boldface** indicates a field-supplied drive is required. (See Note 7.)
2. indicates a field-supplied motor and drive are required.
3. ——— indicates maximum usable watts of a factory-supplied motor.
4. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
5. Values include losses for filters, unit casing, and wet coils.
6. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
7. Standard motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.
8. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 12 — 580D120 Air Delivery, Vertical Discharge Units

AIRFLOW (Cfm)	STANDARD AND ALTERNATE BELT DRIVE MOTORS																			
	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	**552**	**661**	**632**	**810**	701	956	761	1097	816	1216	871	1370	918	1482	967	1736	1010	1903	1063	2221
3100	**565**	**708**	**644**	**859**	711	1014	722	1173	825	1292	879	1447	928	1478	973	1778	1018	1971	1070	2265
3200	**578**	**763**	**656**	**916**	723	1081	782	1241	835	1378	887	1517	937	1745	981	1861	1026	2048	1075	2318
3300	**591**	**818**	**668**	**973**	734	1148	793	1310	845	1465	895	1595	946	1828	991	1963	1032	2099	1080	2380
3400	**605**	**883**	**680**	**1047**	745	1216	803	1387	856	1552	904	1691	953	1912	1000	2074	1041	2203	1083	2389
3500	**619**	**948**	691	1106	755	1284	813	1465	867	1648	914	1796	961	1997	1009	2177	1051	2318	1090	2469
3600	**633**	**1022**	703	1173	766	1353	824	1543	877	1744	924	1901	970	2099	1017	2282	1061	2451	1099	2596
3700	**648**	**1106**	714	1241	777	1430	835	1639	887	1831	935	2015	980	2212	1024	2380	1069	2587	1109	2735
3800	**662**	**1190**	726	1310	789	1526	846	1726	897	1927	946	2169	989	2326	1033	2487	1077	2698	1118	2895
3900	**677**	**1284**	738	1387	801	1613	857	1823	908	2023	956	2282	1000	2460	1042	2624	1085	2819	1127	3049
4000	692	1378	750	1473	813	1718	868	1919	918	2119	967	2397	1010	2587	1052	2763	1093	2933	1142	3187
4100	707	1482	762	1560	825	1814	878	2015	929	2282	977	2505	1021	2726	1062	2914	1102	3097	1155	3373
4200	722	1595	775	1656	837	1910	889	2119	941	2397	987	2624	1032	2866	1072	2971	1110	3244	1169	3576
4300	737	1718	787	1761	848	2006	900	2273	952	2523	999	2744	1042	3010	1081	3141	1118	3396	1185	3794
4400	752	1840	800	1875	860	2110	912	2397	962	2642	1008	2885	1054	3158	1091	3276	1126	3553	1201	4029
4500	768	1980	814	1989	871	2265	924	2523	973	2772	1019	3029	1067	3325	1101	3414	1134	3715	1219	4281
4600	783	2119	827	2110	883	2380	937	2661	983	2904	1030	3155	1079	3497	1111	3555	1142	3883	1237	4548
4700	799	2309	841	2291	894	2496	949	2800	994	3049	1042	3296	1092	3678	1122	3700	1150	4056	1257	4832
4800	814	2469	855	2424	906	2624	961	2952	1003	3186	1052	3440	1105	3866	1132	3848	1158	4235	1277	5133
4900	—	—	868	2578	918	2754	972	3088	1013	3333	1063	3589	1119	4061	1143	3999	1166	4419	1299	5449
5000	—	—	883	2735	931	2904	985	3226	1024	3489	1075	3741	1133	4263	1154	4154	1174	4608	1322	5782

NOTES:
1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. indicates an alternate motor and drive is required.
3. indicates a field-supplied motor and drive are required.
4. ——— indicates maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 2120 with a standard motor and 2615 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 685 to 935 rpm. Alternate motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 13 — 580D150 Air Delivery, Vertical Discharge Units

AIRFLOW (Cfm)	STANDARD AND ALTERNATE BELT DRIVE MOTORS																			
	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	**729**	**1259**	**790**	**1440**	**847**	**1615**	902	1845	955	2044	1008	2272	1060	2494	1108	2719	1152	2919	1190	3092
3800	**745**	**1340**	**805**	**1531**	861	1700	915	1940	967	2149	1019	2378	1070	2620	1118	2846	1163	3074	1203	3267
3900	**761**	**1423**	**820**	**1624**	875	1802	928	2044	979	2272	1029	2494	1079	2737	1128	2983	1173	3221	1214	3433
4000	**777**	**1514**	**836**	**1725**	889	1914	941	2140	991	2387	1040	2620	1089	2873	1137	3120	1183	3368	1225	3590
4100	**793**	**1615**	**851**	**1836**	904	2027	955	2246	1004	2512	1052	2746	1100	3001	1147	3267	1193	3525	1236	3767
4200	**810**	**1717**	867	1948	918	2149	968	2361	1017	2638	1064	2882	1110	3138	1157	3414	1202	3674	1245	3943
4300	**826**	**1828**	883	2070	933	2272	982	2485	1030	2773	1076	3037	1121	3285	1167	3562	1212	3841	1255	4111
4400	**842**	**1940**	898	2193	948	2405	996	2611	1043	2901	1088	3184	1133	3442	1178	3720	1222	3999	1265	4279
4500	**859**	**2061**	914	2316	962	2539	1010	2755	1056	3037	1101	3341	1144	3590	1188	3878	1232	4167	1274	4456
4600	876	2184	930	2459	977	2683	1024	2910	1070	3175	1114	3498	1157	3767	1199	4046	1242	4344	1284	4642
4700	892	2316	945	2593	992	2837	1039	3065	1083	3322	1126	3655	1169	3943	1210	4223	1252	4521	1294	4828
4800	909	2468	961	2737	1008	3001	1053	3230	1097	3479	1140	3822	1181	4130	1222	4400	1263	4707	—	—
4900	926	2611	977	2891	1024	3166	1068	3405	1111	3646	1153	3971	1194	4307	1234	4605	1274	4893	—	—
5000	942	2773	993	3047	1039	3341	1080	3581	1125	3822	1166	4139	1207	4493	1247	4800	1286	5097	—	—
5100	959	2937	1009	3221	1055	3516	1097	3767	1139	4018	1180	4316	1220	4689	1259	5004	—	—	—	—
5200	976	3101	1025	3387	1071	3702	1112	3962	1153	4214	1194	4503	1233	4874	1272	5207	—	—	—	—
5300	993	3285	1041	3572	1086	3897	1127	4158	1168	4428	1208	4698	1246	5060	—	—	—	—	—	—
5400	1010	3470	1057	3757	1102	4093	1142	4372	1182	4642	1221	4902	—	—	—	—	—	—	—	—
5500	1027	3655	1073	3953	1118	4298	1157	4586	1197	4856	1235	5115	—	—	—	—	—	—	—	—
5600	1043	3860	1090	4158	1133	4512	1173	4810	1211	5087	—	—	—	—	—	—	—	—	—	—
5700	1060	4065	1106	4363	1149	4726	1189	5032	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4279	1122	4586	1165	4939	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4503	1139	4810	1181	5170	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	4726	1155	5032	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5207	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. indicates an alternate motor and drive are required.
3. indicates a field-supplied motor and drive are required.
4. ——— indicates maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 3775 with a standard motor and 4400 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 860 to 1080 rpm. Alternate motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .85 (Std)
.87 (Alt)

Table 14 — 580D090 Air Delivery, Horizontal Discharge Units

AIRFLOW (Cfm)	STANDARD BELT DRIVE MOTOR AND ALTERNATE BELT DRIVE															
	External Static Pressure (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	**506**	**539**	**586**	**692**	656	875	718	1064	776	1275	838	1578	898	1954	935	2275
2250	**514**	**562**	593	723	662	907	724	1097	781	1318	841	1604	902	1989	939	2292
2300	**521**	**577**	600	747	668	932	730	1131	786	1335	843	1621	905	2015	943	2309
2400	**536**	**623**	613	795	680	989	741	1199	796	1413	849	1665	910	2041	952	2411
2500	**551**	**669**	626	859	693	1056	753	1275	808	1499	859	1735	912	2050	963	2470
2550	**559**	**692**	634	891	700	1089	759	1318	814	1543	864	1779	915	2067	968	2479
2600	**567**	**716**	641	916	706	1123	764	1353	819	1587	869	1823	918	2093	973	2487
2700	**582**	**779**	655	981	719	1199	776	1430	831	1674	880	1919	927	2180	976	2495
2800	598	835	670	1056	732	1275	789	1517	842	1770	892	2023	938	2275	983	2562
2900	614	899	684	1123	745	1361	802	1604	854	1866	903	2136	949	2386	993	2653
3000	630	973	690	1207	759	1147	815	1700	866	1971	915	2240	961	2504	1003	2767
3100	646	1047	714	1292	773	1543	828	1805	878	2076	926	2352	972	2629	1016	2886
3200	662	1131	729	1378	787	1648	841	1910	891	2188	938	2470	983	2743	1026	3002
3300	679	1216	744	1473	801	1753	854	2023	904	2300	950	2587	995	2870	—	—
3400	695	1310	759	1578	816	1858	867	2136	917	2420	963	2710	1007	2987	—	—
3500	712	1413	774	1683	830	1971	881	2257	930	2546	976	2831	—	—	—	—
3600	729	1517	790	1796	845	2093	895	2386	943	2670	988	2956	—	—	—	—
3700	745	1630	805	1919	860	2223	909	2521	956	2807	—	—	—	—	—	—
3750	754	1691	813	1980	868	2283	917	2587	963	2870	—	—	—	—	—	—
3800	762	1753	821	2041	875	2343	924	2653	970	2933	—	—	—	—	—	—
3900	779	1875	836	2171	890	2479	938	2783	—	—	—	—	—	—	—	—
4000	796	2006	852	2300	905	2612	953	2925	—	—	—	—	—	—	—	—
4100	813	2136	868	2445	920	2751	—	—	—	—	—	—	—	—	—	—
4200	830	2283	884	2587	935	2894	—	—	—	—	—	—	—	—	—	—
4250	839	2360	890	2661	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2428	900	2735	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. indicates an alternate drive is required.
3. indicates a field-supplied motor and drive are required.
4. ——— indicates maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 15 — 580D102 Air Delivery, Horizontal Discharge Units

AIRFLOW (Cfm)	STANDARD BELT DRIVE MOTOR															
	External Static Pressure (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	**506**	**539**	**586**	**692**	**656**	**875**	718	1064	776	1275	838	1578	898	1954	935	2275
2250	**514**	**562**	**593**	**723**	**662**	**907**	724	1097	781	1318	841	1604	902	1989	939	2292
2300	**521**	**577**	**600**	**747**	**668**	**932**	730	1131	786	1335	843	1621	905	2015	943	2309
2400	**536**	**623**	**613**	**795**	**680**	**989**	741	1199	796	1413	849	1665	910	2041	952	2411
2500	**551**	**669**	**626**	**859**	693	1056	753	1275	808	1499	859	1735	912	2050	963	2470
2550	**559**	**692**	**634**	**891**	700	1089	759	1318	814	1543	864	1779	915	2067	968	2479
2600	**567**	**716**	**641**	**916**	706	1123	764	1353	819	1587	869	1823	918	2093	973	2487
2700	**582**	**779**	**655**	**981**	719	1199	776	1430	831	1674	880	1919	927	2180	976	2495
2800	**598**	**835**	**670**	**1056**	732	1275	789	1517	842	1770	892	2023	938	2275	983	2562
2900	**614**	**899**	**684**	**1123**	745	1361	802	1604	854	1866	903	2136	949	2386	993	2653
3000	**630**	**973**	690	1207	759	1417	815	1700	866	1971	915	2240	961	2504	1003	2767
3100	**646**	**1047**	714	1292	773	1543	828	1805	878	2076	926	2352	972	2629	1016	2886
3200	**662**	**1131**	729	1378	787	1648	841	1910	891	2188	938	2470	983	2743	1026	3002
3300	**679**	**1216**	744	1473	801	1753	854	2023	904	2300	950	2587	995	2870	—	—
3400	695	1310	759	1578	816	1858	867	2136	917	2420	963	2710	1007	2987	—	—
3500	712	1413	774	1683	830	1971	881	2257	930	2546	976	2831	—	—	—	—
3600	729	1517	790	1796	845	2093	895	2386	943	2670	988	2956	—	—	—	—
3700	745	1630	805	1919	860	2223	909	2521	956	2807	—	—	—	—	—	—
3750	754	1691	813	1980	868	2283	917	2587	963	2870	—	—	—	—	—	—
3800	762	1753	821	2041	875	2343	924	2653	970	2933	—	—	—	—	—	—
3900	779	1875	836	2171	890	2479	938	2783	—	—	—	—	—	—	—	—
4000	796	2006	852	2300	905	2612	953	2925	—	—	—	—	—	—	—	—
4100	813	2136	868	2445	920	2751	—	—	—	—	—	—	—	—	—	—
4200	830	2283	884	2587	935	2894	—	—	—	—	—	—	—	—	—	—
4250	839	2360	890	2661	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2428	900	2735	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 7.)
2. Shaded cells indicate a field-supplied motor and drive are required.
3. Underlined cells indicate maximum usable watts of a factory-supplied motor.
4. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
5. Values include losses for filters, unit casing, and wet coils.
6. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
7. Standard motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.
8. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 16 — 580D120 Air Delivery, Horizontal Discharge Units

AIRFLOW (Cfm)	STANDARD AND ALTERNATE BELT DRIVE MOTORS																			
	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	**592**	**723**	**661**	**859**	722	989	779	1131	829	1267	880	1404	924	1534	970	1736	1019	1828	1066	2082
3100	**607**	**779**	**676**	**924**	734	1056	791	1199	840	1344	890	1491	935	1695	977	1828	1026	1971	1070	2203
3200	**622**	**835**	690	989	746	1123	803	1275	852	1422	900	1569	946	1786	987	1920	1029	2065	1075	2265
3300	**638**	**899**	705	1056	759	1190	815	1353	864	1508	910	1665	957	1878	998	2022	1037	2169	1082	2326
3400	**653**	**965**	719	1131	772	1275	826	1439	876	1604	921	1753	967	1971	1009	2125	1047	2282	1087	2433
3500	**669**	**1039**	733	1207	786	1361	838	1526	888	1691	933	1858	976	2074	1020	2238	1058	2397	1095	2560
3600	**684**	**1114**	747	1284	800	1456	850	1613	900	1796	945	2014	986	2177	1030	2353	1069	2523	1106	2688
3700	700	1190	760	1370	814	1552	863	1700	912	1892	957	2117	998	2291	1039	2469	1081	2651	1117	2829
3800	715	1275	774	1456	828	1648	875	1805	924	1997	969	2230	1010	2406	1049	2587	1091	2782	1128	2981
3900	731	1370	787	1543	843	1753	888	1910	936	2151	981	2344	1022	2533	1060	2726	1100	2923	1143	3144
4000	747	1456	801	1639	857	1858	902	2032	948	2265	993	2469	1034	2670	1072	2866	1110	3068	1158	3332
4100	763	1560	816	1744	872	1971	916	2203	960	2380	1005	2596	1046	2810	1084	3010	1121	3213	1174	3535
4200	778	1665	831	1884	886	2084	929	2326	972	2505	1016	2735	1058	2952	1094	3155	1132	3369	1192	3753
4300	794	1770	846	1971	900	2256	943	2460	985	2642	1028	2866	1072	3117	1106	3311	1142	3531	1211	3987
4400	810	1884	861	2093	913	2380	958	2605	999	2791	1040	3010	1088	3276	1117	3473	1153	3698	1231	4235
4500	826	2006	876	2273	927	2505	973	2744	1012	2952	1053	3167	1099	3440	1128	3642	1163	3871	1253	4498
4600	842	2177	892	2406	940	2633	987	2904	1024	3117	1065	3321	1113	3611	1140	3817	1174	4049	1276	4775
4700	858	2300	907	2551	954	2782	1002	3068	1037	3275	1077	3481	1127	3789	1152	3997	1184	4233	1300	5068
4800	874	2433	922	2698	968	2933	1018	3232	1050	3439	1089	3646	1142	3973	1163	4184	1195	4422	1325	5376
4900	890	2578	938	2857	984	3063	1034	3406	1063	3609	1101	3816	1157	4163	1175	4377	1205	4617	1352	5698
5000	906	2735	953	3020	998	3216	1050	3588	1077	3785	1114	3991	1173	4360	1187	4576	1216	4818	1381	6036

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. Light shaded cells indicate an alternate motor and drive are required.
3. Dark shaded cells indicate a field-supplied motor and drive are required.
4. Underlined cells indicate maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 2120 with a standard motor and 2615 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 685 to 935 rpm. Alternate motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80

Table 17 — 580D150 Air Delivery, Horizontal Discharge Units

AIRFLOW (Cfm)	STANDARD AND ALTERNATE BELT DRIVE MOTORS																			
	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	**677**	**1129**	**748**	**1316**	**810**	**1498**	869	1700	928	1940	984	2166	1036	2387	1080	2548	1114	2737	1135	2828
3800	**691**	**1194**	**761**	**1390**	**822**	**1582**	880	1776	937	2035	993	2272	1046	2503	1092	2719	1129	2901	1156	3028
3900	**705**	**1267**	**773**	**1473**	**834**	**1674**	891	1862	947	2131	1002	2370	1055	2620	1102	2855	1143	3056	1174	3212
4000	**720**	**1349**	**786**	**1548**	**847**	**1768**	902	1957	957	2228	1011	2485	1064	2737	1112	2983	1155	3212	1190	3405
4100	**734**	**1423**	**800**	**1641**	860	1871	914	2061	967	2316	1021	2593	1072	2855	1121	3120	1165	3368	1203	3581
4200	**749**	**1506**	**813**	**1725**	873	1974	926	2175	978	2414	1030	2710	1081	2983	1130	3258	1175	3516	1215	3757
4300	**764**	**1598**	**826**	**1828**	886	2079	938	2290	989	2521	1040	2837	1090	3111	1139	3396	1185	3664	1226	3925
4400	**779**	**1691**	**840**	**1931**	899	2193	951	2414	1000	2638	1050	2955	1100	3248	1148	3535	1194	3822	1236	4093
4500	**793**	**1785**	**854**	**2035**	912	2307	963	2548	1012	2755	1061	3065	1109	3387	1157	3674	1203	3981	1246	4260
4600	**808**	**1888**	868	2158	925	2459	975	2674	1024	2901	1071	3184	1119	3525	1166	3832	1212	4130	1255	4437
4700	**822**	**2000**	882	2281	937	2548	988	2819	1036	3056	1082	3313	1129	3674	1175	3990	1221	4298	1264	4605
4800	**837**	**2114**	896	2414	950	2674	1001	2964	1048	3212	1093	3461	1139	3813	1185	4148	1230	4456	1273	4782
4900	**852**	**2237**	910	2548	963	2810	1014	3111	1060	3368	1105	3609	1150	3943	1194	4307	1239	4633	1282	4958
5000	867	2361	924	2683	977	2946	1027	3267	1073	3535	1117	3776	1161	4093	1204	4475	1248	4810	1291	5133
5100	882	2485	938	2828	990	3092	1040	3424	1085	3702	1129	3962	1172	4251	1214	4642	1257	4995	—	—
5200	896	2629	952	2973	1003	3248	1053	3590	1098	3869	1141	4148	1183	4419	1225	4791	1267	5170	—	—
5300	911	2773	967	3129	1017	3405	1066	3757	1111	4055	1153	4335	1194	4596	1236	4958	—	—	—	—
5400	926	2919	981	3294	1030	3572	1079	3916	1124	4270	1166	4531	1206	4791	1247	5124	—	—	—	—
5500	940	3074	995	3461	1044	3748	1092	4093	1137	4437	1178	4726	1218	4958	—	—	—	—	—	—
5600	955	3239	1010	3627	1058	3943	1105	4270	1150	4633	1190	4930	1230	5124	—	—	—	—	—	—
5700	970	3405	1024	3804	1072	4139	1118	4456	1163	4837	1203	5143	—	—	—	—	—	—	—	—
5800	985	3581	1039	3981	1086	4335	1131	4652	1176	5041	—	—	—	—	—	—	—	—	—	—
5900	1000	3757	1053	4167	1100	4540	1144	4856	—	—	—	—	—	—	—	—	—	—	—	—
6000	1015	3953	1068	4363	1114	4754	1158	5060	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4139	1083	4558	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4344	1097	4763	1142	5180	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 8.)
2. indicates an alternate motor and drive are required.
3. indicates a field-supplied motor and drive are required.
4. ——— indicates maximum usable watts of a factory-supplied motor.
5. Maximum usable watts input is 3775 with a standard motor and 4400 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 9.
6. Values include losses for filters, unit casing, and wet coils.
7. Use of a field-supplied motor may affect wire sizing. Contact your representative to verify.
8. Standard motor drive range: 860 to 1080 rpm. Alternate motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
9. To convert watts to bhp:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Motor efficiency = .80 (Std)
.87 (Alt)

B. Ventilation Sequence

If unit is equipped with an Durablade economizer or two-position damper, the damper will open to the minimum position whenever the evaporator fan runs.

The damper motor will be energized with 24-vdc power and damper will drive open until SW3 on the damper is deactivated. The damper motor will stop and damper will remain in the minimum ventilation position until the evaporator fan is shut off. When the evaporator fan is shut off, the damper motor is again energized and the damper runs closed until SW2 is activated and the damper motor turns off.

CARE AND MAINTENANCE

To ensure continuing high performance and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This combination heating/cooling unit should be inspected at least once each year by a qualified service person.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ **WARNING:** The ability to perform maintenance on this equipment properly requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND POSSIBLE DAMAGE TO THIS EQUIPMENT.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filters each month. Clean or replace when necessary.
2. Inspect cooling coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness. Inspect belts, and belt tension each heating and cooling season. Clean, adjust or replace when necessary.
4. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service when necessary.
5. Check and inspect heating section before each heating season. Clean and adjust when necessary.
6. Check and clean vent screen if needed.

⚠ **WARNING:** Failure to follow these warnings could result in serious personal injury:

1. Turn off gas supply, *then* turn off electrical power to the unit before performing any maintenance or service on the unit.
2. Use extreme caution when removing panels and parts. As with any mechanical equipment, personal injury can result from sharp edges, etc.
3. Never place anything combustible either on, or in contact with, the unit.
4. Should overheating occur, or the gas supply fail to shut off, shut off the external main manual gas valve to the unit, *then* shut off the electrical supply.

I. AIR FILTER

⚠ **CAUTION:** Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filters at least once each month, and replace (throwaway-type) or clean (cleanable-type) at least twice during each heating and cooling season and whenever the filters become clogged with dust and lint.

Replace filters when necessary with the same dimensional size and type as originally provided.

SERVICE

⚠ **CAUTION:** When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

I. CLEANING

Inspect unit interior at the beginning of each heating and cooling season or more frequently as operating conditions require.

A. Evaporator Coil

1. Turn unit power off and tag disconnect. Remove evaporator coil access panel.
2. If economizer is installed, remove economizer by disconnecting Molex plug and economizer mounting screws. Refer to Accessory Economizer Installation Instructions or Optional Economizer Installation sections on pages 13 and 16 for further details.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return-air section to remove foreign material. Caution should be taken as to not overflow the evaporator drain condensate pan.
5. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

B. Condenser Coil

Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor-air conditions.

<u>One-Row Coils</u>

Wash coil with commercial cleaner. Clean outer surfaces with a stiff brush in the normal manner. It is not necessary to remove top panel.

<u>Two-Row Coils</u>

Clean coil as follows:

1. Turn off unit power and tag disconnect.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 50. To hold top panel open, place coil corner post between top panel and center post. See Fig. 51.
4. Remove screws securing coil to center post.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 52.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post.
9. Reinstall the coil corner post and replace all screws.

II. LUBRICATION

A. Compressors

Each compressor is charged with correct amount of oil at the factory.

B. Fan-Motor Bearings

Fan-motor bearings are of the permanently lubricated type. No further lubrication is required. No lubrication of condenser-or evaporator-fan motors is required.

III. CONDENSER FAN ADJUSTMENT (Fig. 53)

1. Shut off unit power supply and tag disconnect.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in Fig. 53.
5. Tighten setscrews.
6. Replace condenser-fan assembly.

IV. BLOWER BELT ADJUSTMENT

Inspect blower belt for wear and proper belt tension, and pulley alignment at the beginning of each heating and air conditioning season.

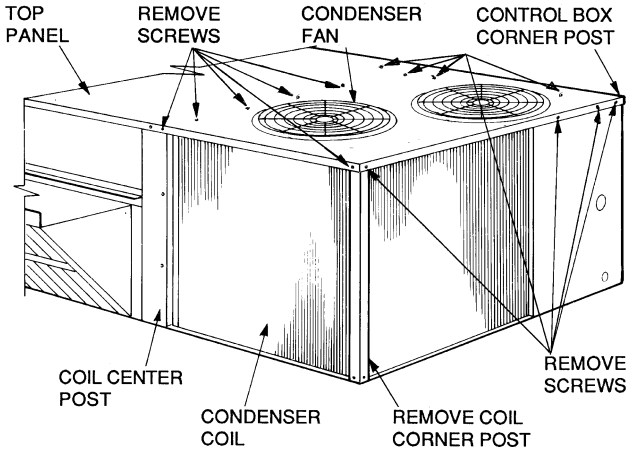


Fig. 50 — Cleaning Condenser Coil

V. REFRIGERANT CHARGE

A. Checking and Adjustment Refrigerant Charge

The refrigerant system is fully charged with R-22 refrigerant, tested, and factory-sealed. Unit must operate in Cooling mode a minimum of 10 minutes before checking charge.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge.

A superheat charging chart is attached to the outside of the service access panel. The chart includes the required suction line temperature at given suction line pressures and outdoor ambient temperatures.

An accurate superheat, thermocouple- or thermistor-type thermometer and a gage manifold are required when using the superheat charging method for evaluating the unit charge. *Do not use mercury or small dial-type thermosmeters because they are not adequate for this type of measurement.*

⚠ **CAUTION:** When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

Proceed as follows:

1. Remove caps from low- and high-pressure service fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gage hoses to low- and high-pressure service fittings, respectively.
3. Start unit in Cooling mode and let unit run 10 minutes until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (F db).
   b. Evaporator inlet-air temperature (F db).
   c. Suction-tube temperature (F) at low-side service fitting.
   d. Suction (low-side) pressure (psig).
5. Using "Cooling Charging Charts" compare outdoor-air temperature (F db) with the suction line pressure (psig) to determine desired system operating suction line temperature. See Fig. 54-57.
6. Compare actual suction-tube temperature with desired suction-tube temperature. Using a tolerance of ±3° F, add refrigerant if actual temperature is more than 3° F higher than proper suction-tube temperature, or remove refrigerant if actual temperature is more than 3° F lower than required suction-tube temperature.

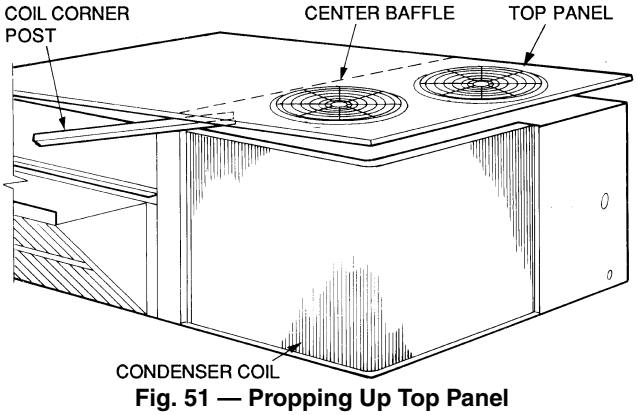


Fig. 51 — Propping Up Top Panel

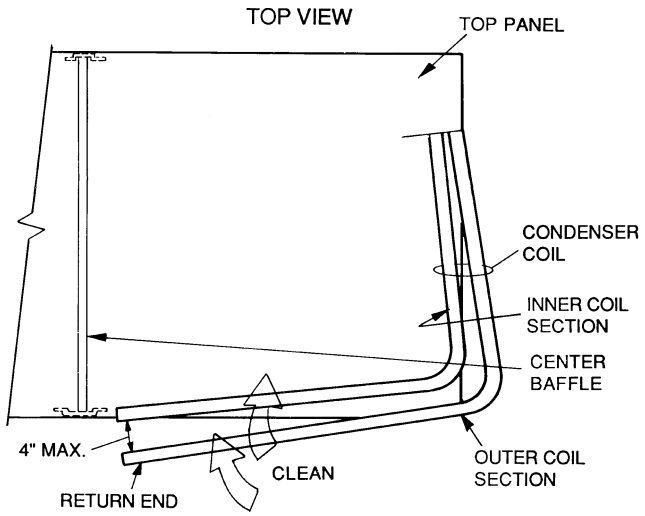
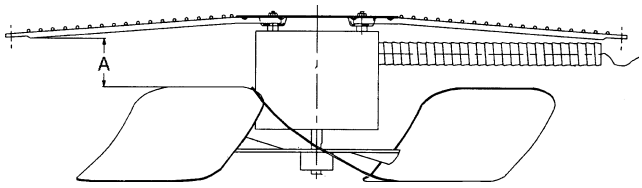


Fig. 52 — Separating Coil Sections



UNIT VOLTAGE	FAN HEIGHT "A" (in.)
208/230 v	2.75
460 and 575 v	3.50

Fig. 53 — Condenser Fan Adjustment

B. To Use Cooling Charging Charts

This method is to be used in Cooling mode only.

Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully reclaim some of the charge. Recheck the suction pressure as charge is adjusted.

EXAMPLE: (Fig. 57, Circuit No. 1)

Outdoor Temperature . . . . . 85 F
Suction Pressure . . . . . 76 psig
Suction Temperature should be . . . . . 58 F
(Suction Temperature may vary ± 5 F.)

C. Refrigerant Leaks

Proceed as follows to repair a refrigerant leak and to charge the unit:

1. Locate leak and ensure that refrigerant system pressure has been relieved.
2. Repair leak following accepted practices.

NOTE: Install a filter drier in the liquid line whenever the system has been opened for repair. Install filter drier where strainer assembly is located.

3. Add a small charge of R-22 refrigerant vapor to system and leak-test unit.
4. Evacuate refrigerant system to 500 microns if additional leaks are not found.
5. Charge unit with R-22 refrigerant, using a volumetric-charging cylinder or accurate scale. *Refer to unit rating plate for required charge.* Be sure to add extra refrigerant to compensate for internal volume of filter drier.

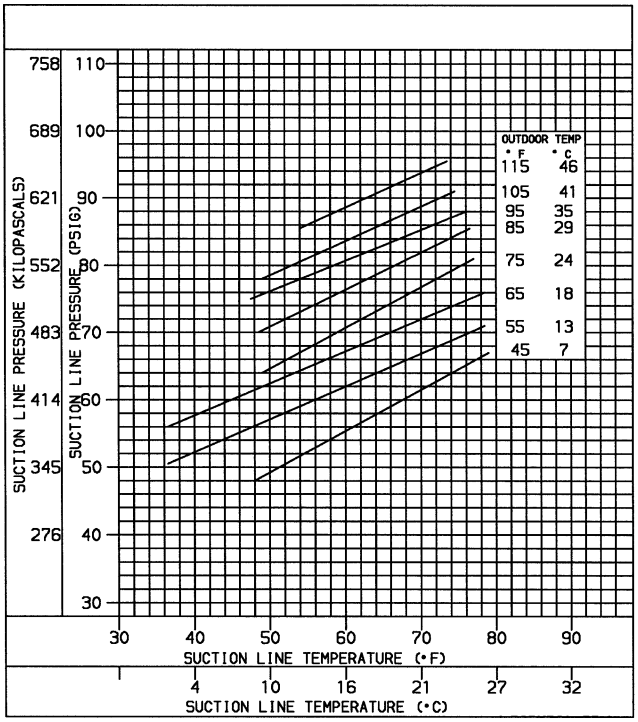


Fig. 54 — Cooling Charging Chart; 580D090

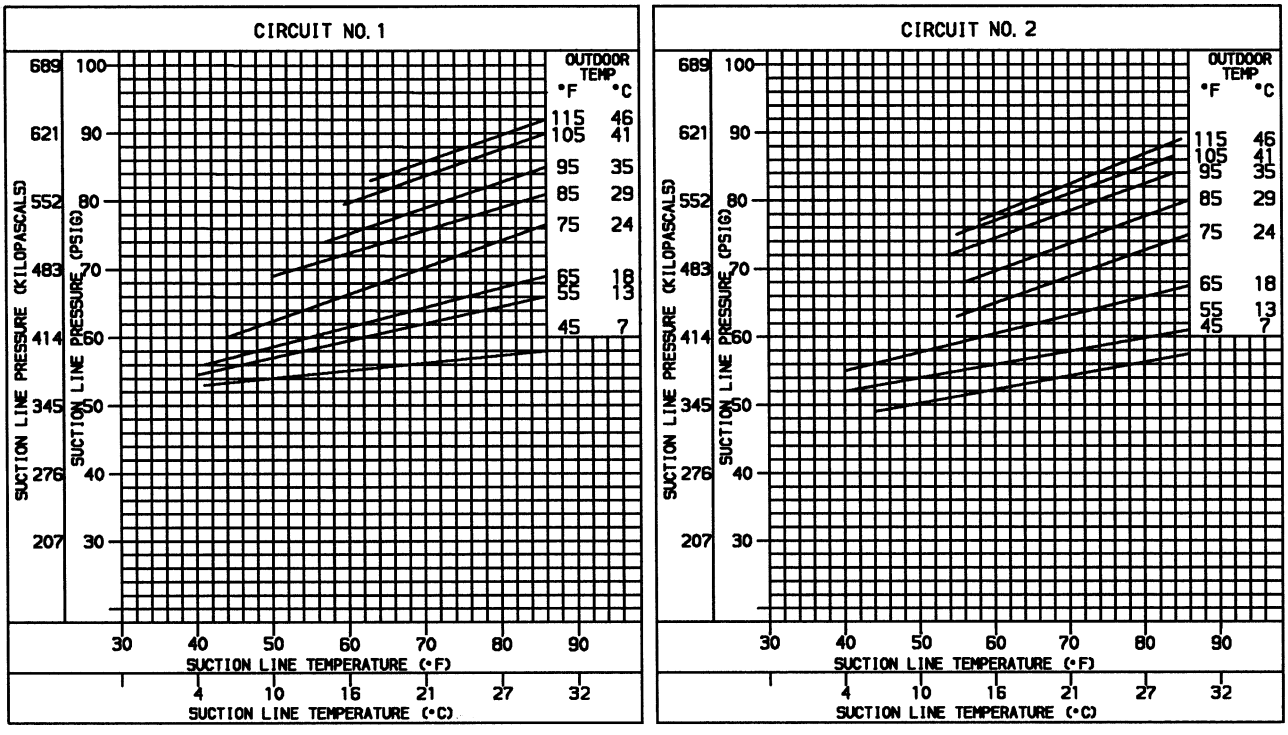


Fig. 55 — Cooling Charging Chart; 580D102

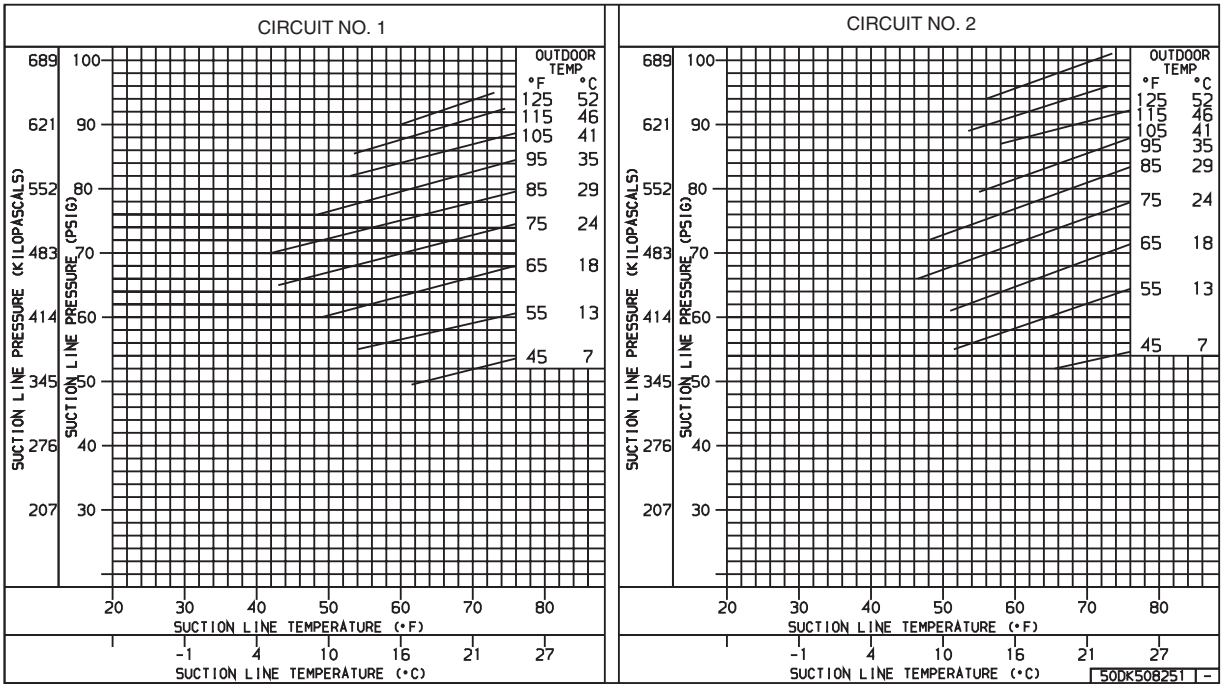


Fig. 56 — Cooling Charging Chart; 580D120

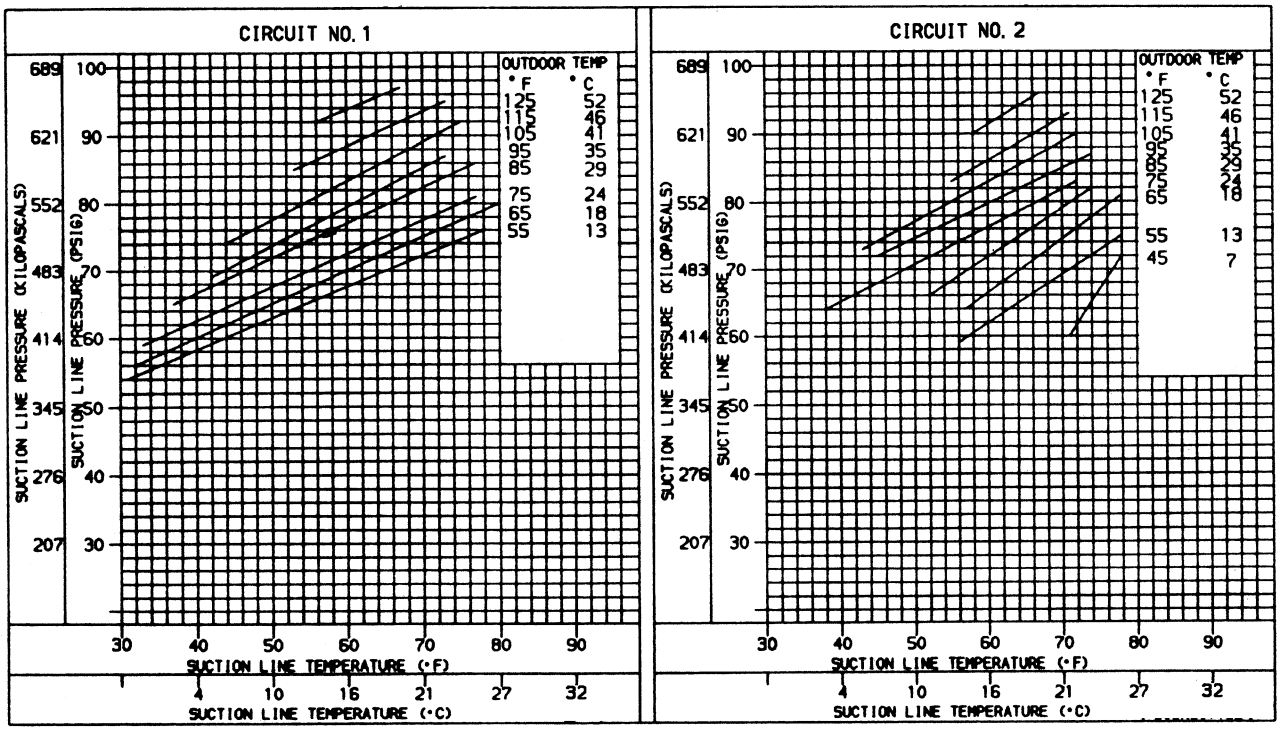


Fig. 57 — Cooling Charging Chart; 580D150

VI. MAIN BURNERS

At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust if necessary.

VII. FLUE GAS PASSAGEWAYS

To inspect the flue collector box and upper areas of the heat exchanger:

1. Remove the combustion blower wheel and motor assembly according to directions in Combustion-Air Blower section below.
2. Remove the flue cover to inspect the heat exchanger.
3. Clean all surfaces as required using a wire brush.

VIII. COMBUSTION-AIR BLOWER

Clean seasonally to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

To inspect blower wheel, shine a flashlight into draft hood opening. If cleaning is required, remove motor and wheel as follows:

1. Slide burner access panel out.
2. Remove the 6 screws that attach induced-draft motor housing to vestibule plate (Fig. 58).
3. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 4 and 5.
4. To remove blower, remove 2 setscrews.
5. To remove motor, remove 4 screws that hold blower housing to motor mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
6. To reinstall, reverse the procedure outlined above.

IX. LIMIT SWITCH

Remove blower access panel (see Fig. 3). Limit switch is located on the fan deck.

X. BURNER IGNITION

Unit is equipped with a direct-spark ignition, 100% lockout system. Integrated Gas Unit Controller (IGC) is located in the control box (Fig. 15). The IGC contains a self-diagnostic LED (light-emitting diode). During service, refer to the label on the control box cover or Table 18 for an explanation of LED error code descriptions.

A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is uninterrupted. When a break in power occurs, the IGC will be reset (resulting in a loss of fault history. The indoor (evaporator) fan ON/OFF times will also be reset. The LED error code can be observed through the viewport.

If lockout occurs, unit may be reset by interrupting the power supply to unit for at least 5 seconds.

Table 18 — LED Error Code Description*

LED INDICATION	ERROR CODE DESCRIPTION
ON	Normal Operation
OFF	Hardware Failure
1 Flash†	Evaporator Fan On/Off Delay Modified
2 Flashes	Limit Switch Fault
3 Flashes	Flame Sense Fault
4 Flashes	4 Consecutive Limit Switch Faults
5 Flashes	Ignition Lockout Fault
6 Flashes	Induced-Draft Motor Fault
7 Flashes	Rollout Switch Fault
8 Flashes	Internal Control Fault

LEGEND

LED — Light-Emitting Diode

*A 3 second pause exists between LED error code flashes. If more than one error code exists, all applicable codes will be displayed in numerical sequence.

†Indicates a code that is not an error. The unit will continue to operate when this code is displayed.

NOTE: Refer to Tables 19-22 for additional troubleshooting information.

A. Removal and Replacement of Gas Train (See Fig. 58)

⚠ **CAUTION:** When servicing gas train, do not hit or plug orifice spuds.

1. Shut off manual gas valve.
2. Shut off power to unit and tag disconnect.
3. Slide out burner compartment side panel.
4. Disconnect gas piping at unit gas valve.
5. Remove wires connected to gas valve. Mark each wire.
6. Remove wires from ignitor and sensor.
7. Remove the two screws that attach the burner rack to the vestibule plate.
8. Slide the burner tray out of the unit (Fig. 45).
9. To reinstall, reverse the procedure outlined above.

B. Cleaning and Adjustment

1. Remove burner rack from unit as described above.
2. Inspect burners and if dirty, remove burners from rack.
3. Using a soft brush, clean burners and cross-over port as required.
4. Adjust spark gap. See Fig. 59.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

XI. REPLACEMENT PARTS

A complete list of replacement parts may be obtained from your distributor upon request.

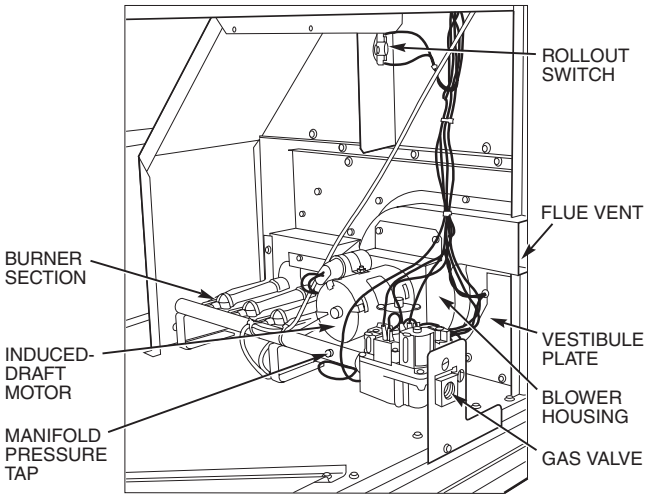


Fig. 58 — Burner Section Details

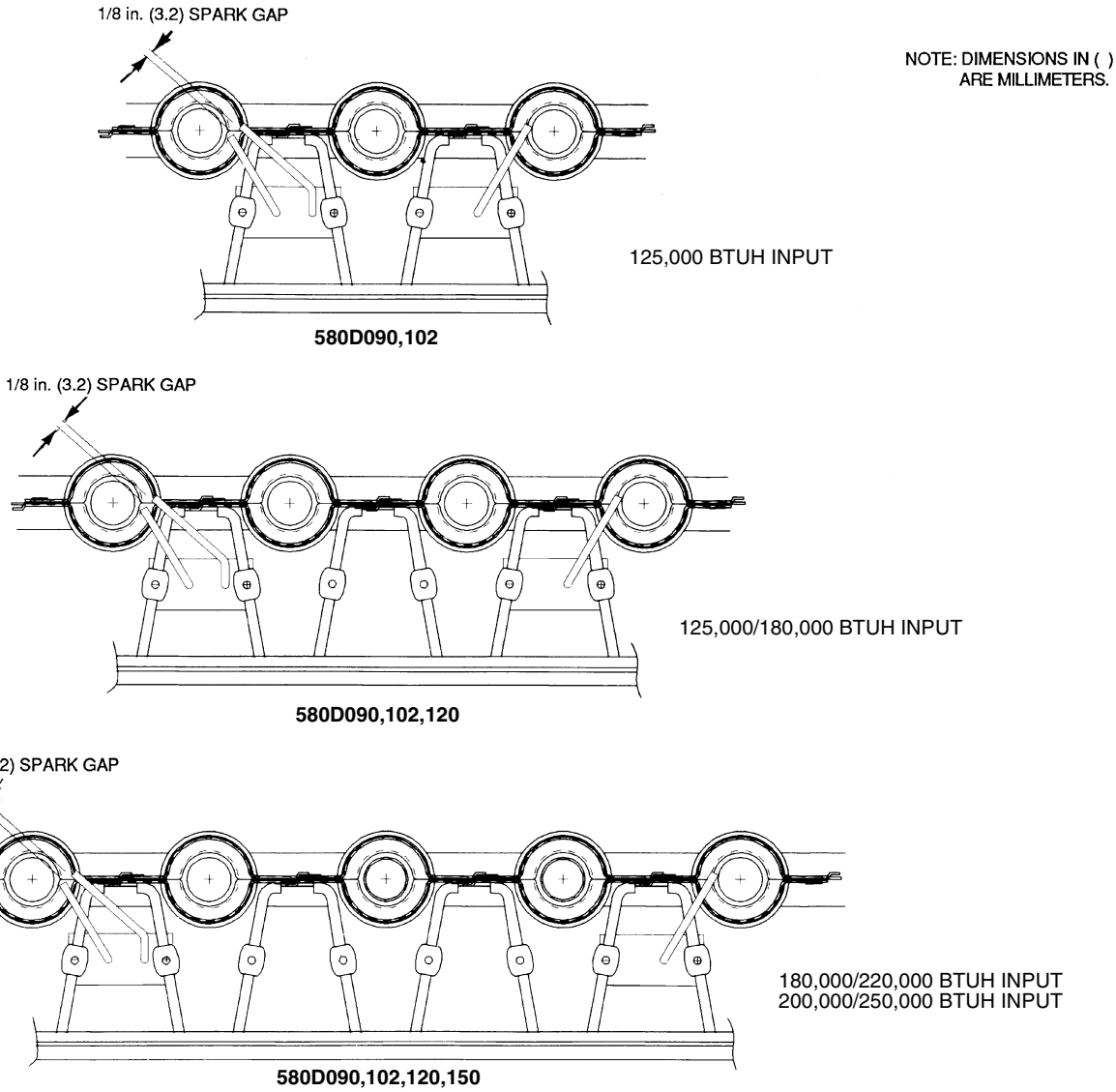


Fig. 59 — Spark Gap Adjustment

Table 19 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate specifications.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor makes excessive noise (580D150 scroll only).	Compressor rotating in wrong direction.	Reverse the 3-phase power leads as described on page 24.
Compressor operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak; repair and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks; repair and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction pressure too low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.
Evaporator fan will not shut off.	Time off delay not finished.	Wait for 30 second off delay.

Table 20 — Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners will not ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air, purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit.
		Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool down period before resetting.
	Miswired or loose connections.	Check all wiring and wire nut connections.
	Burned-out heat anticipator in thermostat.	Replace thermostat.
	Broken thermostat wires.	Run continuity check. Replace wires, if necessary.
Inadequate heating.	Dirty air filter.	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure, or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow.	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Use high speed tap, increase fan speed, or install optional blower, as suitable for individual units.
	Limit switch cycles main burners.	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
	Too much outdoor air.	Adjust minimum position.
		Check economizer operation.
Poor flame characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Check all screws around flue outlets and burner compartment. Tighten as necessary.
		Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary.
		Check orifice to burner alignment.
Burners will not turn off.	Unit is locked into Heating mode for a one minute minimum.	Wait until mandatory one minute time period has elapsed or reset power to unit.

Table 21 — LED Error Code Service Analysis

PROBLEM	CAUSE	REMEDY
Hardware failure. (LED OFF)	Loss of power to control module (IGC).	Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, and transformer. Units without a 24-v circuit breaker have an internal overload in the 24-v transformer. If the overload trips, allow 10 minutes for automatic reset.
Fan ON/OFF delay modified (LED/ FLASH)	High limit switch opens during heat exchanger warm-up period before fan-on delay expires. Limit switch opens within three minutes after blower-off delay timing in Heating mode.	Ensure unit is fired on rate and temperature rise is correct. Ensure unit's external static pressure is within application guidelines.
Limit switch fault. (LED 2 flashes)	High temperature limit switch is open.	Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is in accordance with the range on the unit nameplate.
Flame sense fault. (LED 3 flashes)	The IGC sensed flame that should not be present.	Reset unit. If problem persists, replace control board.
4 consecutive limit switch faults. (LED 4 flashes)	Inadequate airflow to unit.	Check operation of indoor (evaporator) fan motor and that supply-air temperature rise agrees with range on unit nameplate information.
Ignition lockout. (LED 5 flashes)	Unit unsuccessfully attempted ignition for 15 minutes.	Check ignitor and flame sensor electrode spacing, gaps, etc. Ensure that flame sense and ignition wires are properly terminated. Verify that unit is obtaining proper amount of gas.
Induced-draft motor fault. (LED 6 flashes)	IGC does not sense that induced-draft motor is operating.	Check for proper voltage. If motor is operating, check the speed sensor plug/IGC Terminal J2 connection. Proper connection: PIN 1 — White, PIN 2 — Red, PIN 3 — Black.
Rollout switch fault. (LED 7 flashes)	Rollout switch has opened.	Rollout switch will automatically reset, but IGC will continue to lock out unit. Check gas valve operation. Ensure that induced-draft blower wheel is properly secured to motor shaft. Reset unit at unit disconnect.
Internal control fault. (LED 8 flashes)	Microprocessor has sensed an error in the software or hardware.	If error code is not cleared by resetting unit power, replace the IGC.

⚠ **WARNING:** If the IGC must be replaced, be sure to ground yourself to dissipate any electrical charge that may be present before handling new control board. The IGC is sensitive to static electricity and may be damaged if the necessary precautions are not taken.

IMPORTANT: Refer to Table 20 — Heating Service Analysis for additional troubleshooting analysis.

LEGEND

IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode

Table 22 — Durablade Economizer Service Analysis

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (evaporator) fan is off.	1. Check to ensure that 24 vac is present at terminal C1 on the IFC or that 24 vac is present at the IFO terminal. Check whether 24 vac is present at PL6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram).
		2. Check proper thermostat connection to G on the connection board.
	No power to economizer motor.	1. Check that SW3 is properly making contact with the damper blade. Check that SW1 is in the NC (normally closed) position.
		2. Check diode D18. If diode is not functioning properly, replace economizer control board.
		3. Confirm that the economizer control board is grounded properly at PL6-4 (brown wire) and at brown terminal of the economizer control board (brown wire). The economizer motor must also be grounded properly at the negative motor terminal (brown wire).
		4. Verify SW1 and SW3 are working and wired properly (see unit label diagram).
		5. Check for 24 vac input at both PL6-1 (red wire) and PL6-3 (black wire). If 24 vac not present, check unit wiring (see unit label diagram). If 24 vac is found in both places, check for 24 vac at the yellow terminal of the economizer control board (yellow wire). If 24 vac power is not present, replace the economizer control board.
	Economizer motor failure.	If the indoor (evaporator) fan and economizer motor are energized, verify that there is a minimum of 18 vdc at the positive motor terminal. If the motor is not operating, replace the motor.
Economizer operation limited to minimum position.	OAT or EC set too high.	1. Set at correct temperature (3 F below indoor space temperature).
		2. Check OAT or EC by setting above outdoor temperature or humidly level. If the OAT or EC switches do not close, replace OAT or EC.
	Verify economizer control board is correctly wired and works properly.	1. Perform the following tests when OAT or EC is closed, Y1 is called for and damper is at minimum position. Confirm 24 vac on gray terminal of the economizer control board (gray wire). If 24 vac is not present, check wiring (see unit label diagram).
		2. Verify that SW1 and SW3 are wired correctly and working properly (see unit label diagram).
		3. Check to ensure that 24 vac exists at PL6-2 (blue wire). If 24 vac is not present, check wiring (see unit wiring label diagram).
		4. Check 24 vac output at PL6-10 (white wire). If 24 vac is not present, replace economizer control board.
	Check SAT.	1. After verifying that the OAT and EC settings and the economizer control board wiring are correct, check to ensure that the 24 vac terminal of the SAT has 24 vac (white wire). If OAT, EC, and control board are functioning and wired properly and no 24 vac exists, check wiring (see unit label diagram).
		2. If supply-air temperature is greater than 57 F, 24 vac should be found at terminal T2 on the SAT (pink wire). If 24 vac is not present, replace SAT.

(Table continued on page 42.)

Table 22 — Durablade Economizer Service Analysis (cont)

PROBLEM	CAUSE	REMEDY
Damper does not close.	Incorrect wiring of economizer.	1. Verify that SW2 and SW4 are wired and working properly (see unit label diagram).
		2. Check diode D18. If diode is not functioning properly, replace economizer control board.
	Verify economizer control board is functioning properly.	1. After verifying that the wiring is correct, modulate the damper to the minimum position. Remove the calls for G.
		2. If the damper does not move, check for 24 vac at PL6-1 (red wire). If 24 vac is not present, check wiring (see unit label diagram).
		3. If damper still does not move, check for 24 vac at blue terminal of economizer control board (blue wire). If 24 vac is not present, replace the economizer circuit board.
	Check SAT.	1. After verifying that the wiring is correct and the economizer control board is functioning properly, place the OAT or EC switch in the closed position. Place a call for Y1 and open the damper to the fully open position. Confirm that the 24 vac terminal of the SAT has 24 vac (white wire). If 24 vac is not present, check wiring (see unit label diagram).
		2. If supply-air temperature is less than 52 F, 24 vac should be found at terminal T1 on the SAT (violet wire). If 24 vac not found, replace SAT.
	Economizer motor failure.	If economizer control board and SAT are functioning properly, verify that there is a minimum of 18 vdc at the positive motor terminal. If a minimum of 18 vdc is present and the motor is still not operating, replace the motor.
Economizer damper does not close on power loss.	Verify that close-on-power-loss and economizer control board are functioning properly.	1. Check voltage potential across batteries. If lower than 14 vdc, replace close-on-power-loss power supply (9-v alkaline batteries). It is recommended that you check this emergency power supply on a regular basis or whenever the filters are changed.
		2. If the close-on-power-loss and economizer control board are functioning properly, check for 14 vdc or higher at the blue terminal of the economizer control board (blue wire) when power is disconnected from unit. If 14 vdc is not present, replace the control board.

LEGEND

C1 — Common Power
EC — Enthalpy Control
IFC — Indoor (Evaporator) Fan Contactor
IFO — Indoor (Evaporator) Fan On
OAT — Outdoor-Air Thermostat
PL — Plug
SAT — Supply-Air Thermostat
SW — Economizer Position Switch

Table 23 — EconoMi$er Economizer Service Analysis

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (Evaporator) Fan is Off.	Check to ensure that 24 vac is present at Terminal C1 (Common Power) on the IFC (Indoor [Evaporator] Fan contactor) or that 24 vac is present at the IFO (Indoor [Evaporator] Fan On) terminal. Check whether 24 vac is present at PL (Plug) 6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram). Check proper thermostat connection to G on the connection board.
	No power to EconoMi$er controller.	Check to ensure that 24 vac is present across Terminals 24 VAC and 24V COM on the EconoMi$er control. If 24 vac is not present, check wiring (see unit label diagram). If 24 vac is present, STATUS light should be on constantly.
	No power to G Terminal.	If IFM is on, check to ensure 24 vac is present on G Terminal of the EconoMi$er controller. If 24 vac is not present, check wiring (see unit label diagram).
	Controller fault.	If STATUS light is flashing on flash, the EconoMi$er controller is experiencing a fault condition. Cycle power to the controller. If condition continues, replace the EconoMi$er controller.
	Thermostat fault.	If STATUS light is flashing two flashes, the EconoMi$er controller senses the thermostat is wired incorrectly. Check wiring between the thermostat and the connection board in the electrical panel. The fault condition is caused by Y2 being energized before Y1.
	Actuator Fault.	Check the wiring between the EconoMi$er controller and the actuator. Hold CONFIG button between three and ten seconds to verify the actuator's operation. (This process takes three minutes to complete.)
EconoMi$er operation limited to minimum position.	Minimum position set incorrectly.	Verify that the MIN POS (%) is set greater than zero. Adjust MIN POS (%) to 100% to verify operation, and then set to correct setting.
	EconoMi$er changeover set point set too high or too low.	Set at correct value. See Table 4.
	Supply air temperature sensor faulty.	If STATUS light is flashing four flashes, the supply air temperature sensor is faulty. Check wiring or replace sensor.
	OAT sensor faulty.	If STATUS light is flashing five flashes, the OAT sensor is faulty. Check wiring or replace sensor.
Damper position less than minimum position set point.	Supply air low limit strategy controlling.	The supply-air temperature is less than 45 F, causing the minimum position to decrease. Refer to the Start-Up instructions. Verify correct setting of MIN POS (%). If correct, EconoMi$er is operating correctly.
Damper does not return to minimum position.	CO_2 ventilation strategy controlling.	If a CO_2 sensor is being used, and the damper position is greater than minimum position, the ventilation control strategy is controlling. Refer to the Start-Up instructions. EconoMi$er is operating correctly.
Damper does not close on power loss	Damper travel is restricted.	Check to ensure the damper is not blocked.

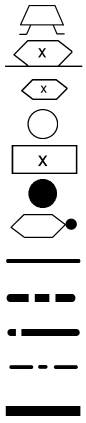
LEGEND

IFM — Indoor (Evaporator) Fan Motor
OAT — Outdoor-Air Temperature

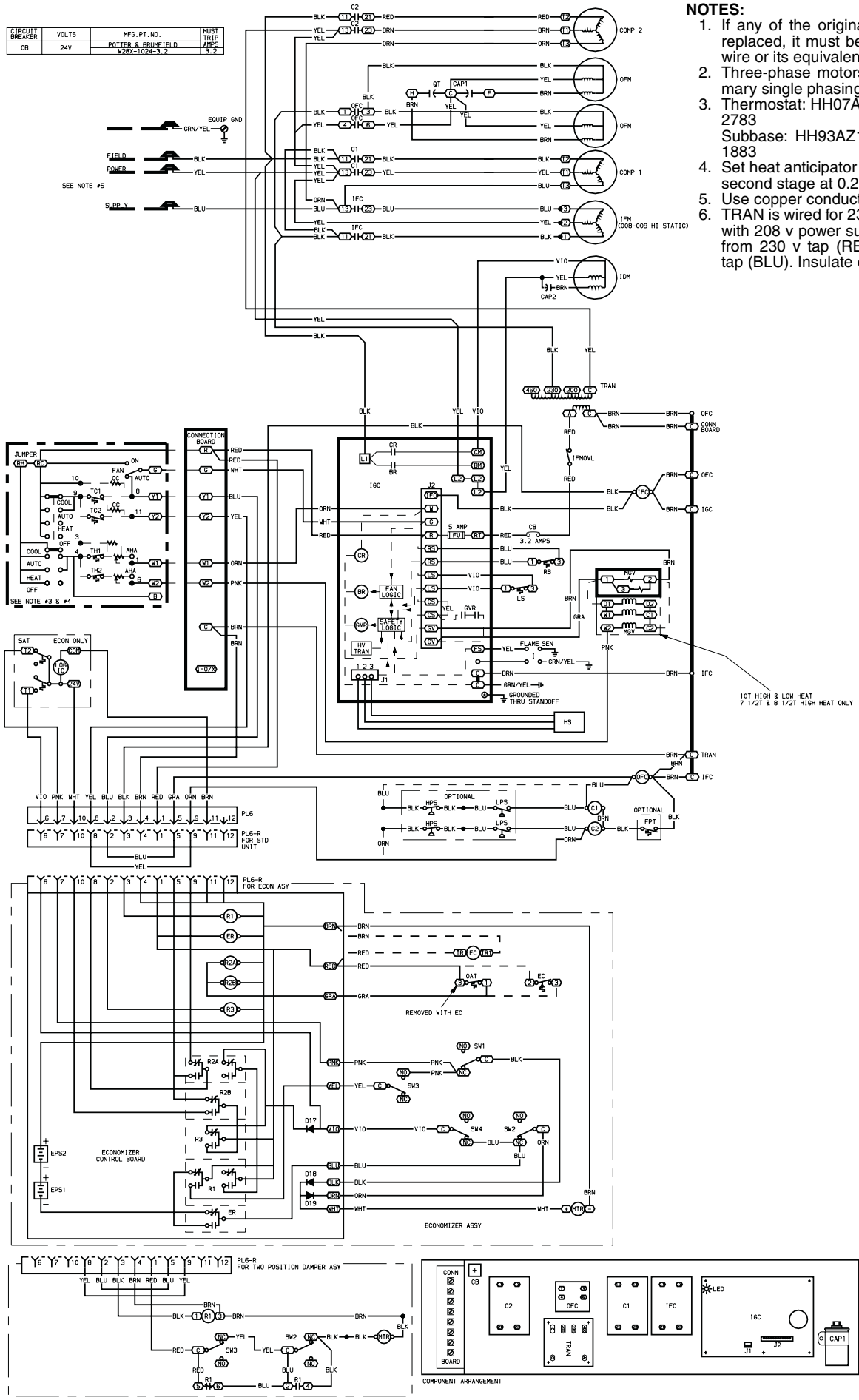
LEGEND FOR FIG. 60

IMPORTANT: Refer to unit wiring label for actual unit wiring information.

AHA — Adjustable Heat Anticipator
BR — Blower Relay
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
COMP — Compressor Motor
CR — Combustion Relay
D — Diode
EC — Enthalpy Control
ECON — Economizer
EPS — Emergency Power Supply
EQUIP — Equipment
ER — Economizer Relay
FPT — Freeze-Protection Thermostat
GND — Ground
GVR — Gas Valve Relay
HPS — High-Pressure Switch
HS — Hall Effect Sensor
HV — High Voltage
I — Ignitor
IDM — Induced-Draft Motor
IFC — Indoor (Evaporator) Fan Contactor
IFM — Indoor (Evaporator) Fan Motor
IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode
LPS — Low-Pressure/Loss-of-Charge Switch
LS — Limit Switch
MGV — Main Gas Valve
MTR — Motor
OAT — Outdoor-Air Thermostat
OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
PL — Plug Assembly
QT — Quadruple Terminal
R — Relay
RS — Rollout Switch
SAT — Supply-Air Thermostat
SEN — Sensor
SW1 — Switch Fully Open
SW2 — Switch Fully Closed
SW3 — Switch Minimum Vent Position
SW4 — Switch Maximum Vent Position
TC — Thermostat-Cooling
TH — Thermostat-Heating
TRAN — Transformer



Field Splice
Marked Wire
Terminal (Marked)
Terminal (Unmarked)
Terminal Block
Splice
Splice (Marked)
Factory Wiring
Field Control Wiring
Field Power Wiring
Accessory or Optional Wiring
To indicate common potential only; not to represent wiring.



NOTES:

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single phasing conditions.
3. Thermostat: HH07AT170, 172, 174 and P272-2783
   Subbase: HH93AZ176, 178 and P272-1882, 1883
4. Set heat anticipator for first stage at 0.14 amp, second stage at 0.2 amp.
5. Use copper conductors only.
6. TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (RED) and connect to 200 v tap (BLU). Insulate end of 230 v tap.

Fig. 60 — Typical Wring Schematic and Component Arrangement

START-UP CHECKLIST
(Remove and Use in Job File)

I. PRELIMINARY INFORMATION:

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

UNIT NO.: _____ JOB LOCATION: _____

JOB NAME: _____

II. PRE-START-UP (insert checkmark in box as each item is completed)

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE ALL SHIPPING TIEDOWN BANDS ON COMPRESSOR (SIZE 150 ONLY) PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT INDOOR- AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ ENSURE BELT TENSION AND BLOWER PULLEYS ARE PROPERLY ALIGNED

III. START-UP:

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
INDOOR-FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	_____	DB		
RETURN-AIR TEMPERATURE	_____	DB	_____	WB
COOLING SUPPLY AIR	_____	DB	_____	WB
GAS HEAT SUPPLY AIR	_____	DB		

PRESSURES

GAS INLET PRESSURE	_____	IN. WG		
GAS MANIFOLD PRESSURE	_____	IN. WG (HI FIRE)		
REFRIGERANT SUCTION	_____	PSIG — CIRCUIT NO. 1	_____	PSIG — CIRCUIT NO. 2
REFRIGERANT DISCHARGE	_____	PSIG — CIRCUIT NO. 1	_____	PSIG — CIRCUIT NO. 2

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING TABLES
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION (580D150 SCROLL UNITS ONLY)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE